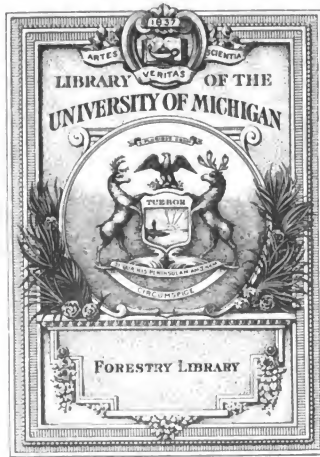


The woods of the United States

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Sargent, American
Museum of ...

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THE WOODS OF THE UNITED STATES.

AMERICAN MUSEUM OF NATURAL HISTORY.

JESUP COLLECTION.

THE
WOODS OF THE UNITED STATES.

WITH AN ACCOUNT OF
THEIR STRUCTURE, QUALITIES, AND USES.

WITH

Geographical and other Notes upon the Trees
which produce them.

By *Charles S. Sargent*
C. S. SARGENT.

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INTRODUCTION.

THE American Museum of Natural History is indebted to its enlightened and public-spirited President, Mr. MORRIS K. JESUP, for a magnificent collection of woods, which display, for the first time in a satisfactory manner, the forest wealth of the United States. The conception of this collection belongs to Mr. Jesup. The forests of the United States are not surpassed by those of any other country in the variety and value of the timbers which they produce. Many of these are little known or appreciated commercially; and it was the belief of the founder of this collection that the opportunity it would afford to engineers, architects, and mechanics to examine specimens of the material produced by the forests of the whole country would be of great and immediate practical utility to the community, and that the presence of such a collection in the Museum of Natural History would facilitate the scientific and industrial study of the Sylva of this country, and develop a popular interest in forests and forest science.

Mr. Jesup's collection is the outgrowth of an investigation of the forest wealth of this country commenced by me more than five years ago. The results of that investigation have been published in Vol. IX. of the final Reports of the Tenth Census, which this collection will serve to illustrate.

The trees of the United States are represented in the Museum by large and characteristic trunk specimens, arranged in the sequence of their botanical relationship. These specimens are cut in such a manner as to display the bark, and cross and longitudinal sections of the wood, both polished and in its natural condition. They are supplemented, in the case of trees of commercial importance,

by carefully selected planks, or burls, which often show better than logs the true industrial value of the wood.

Specimens of a few of the arborescent species of the United States have not yet been secured, and others are still in preparation. These will be added to the collection as rapidly as possible.

A series of life-size water-colors of the foliage, flowers, and fruit of each tree represented in the collection by a wood specimen is in course of preparation. They will be displayed with the collection as fast as completed. An herbarium of the trees of the United States, arranged by Mr. C. E. FAXON of the Arnold Arboretum, will afford special students of dendrology an opportunity of critically studying the collection.

The following catalogue of the trees of this country will serve as a guide to the collection; it is condensed from Vol. IX. of the Reports of the Tenth Census, from which are derived the tables relating to the physical properties of the woods of the United States. These tables have been prepared for this publication by Mr. S. P. SHARPLES, of Cambridge.

C. S. SARGENT.

ARNOLD ARBORETUM, BROOKLINE, MASS.,
May, 1885.

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CATALOGUE OF FOREST TREES.

MAGNOLIACEÆ.

1. *Magnolia grandiflora*, L.

Big Laurel. Bull Bay.

Cape Fear River, North Carolina, south, near the coast, to Mosquito Inlet and Tampa Bay, Florida; along the coast of the Gulf States to southwestern Arkansas, and the valley of the Brazos River, Texas, extending north in the valley of the Mississippi River to latitude $32^{\circ} 30'$.

A magnificent evergreen tree, 18 to 27 metres in height, with a trunk 0.60 to 1.20 metres in diameter; reaching its greatest development on the "bluff" formations along the eastern bank of the Mississippi River from Vicksburg to Natchez, and in western Louisiana.

Wood heavy, hard, not strong, close-grained, compact, easily worked, satiny; medullary rays very numerous, thin; color creamy white or often light brown, the heavier sap-wood nearly white; little used except as fuel; suitable for interior finish, fine cabinet work, etc.

2. *Magnolia glauca*, L.

Sweet Bay. White Bay. Beaver Tree. White Laurel. Swamp Laurel.

Cape Ann, Massachusetts; New Jersey, southward, generally near the coast, to Bay Biscayne and Tampa Bay, Florida; westward through the valley of the Mississippi River south of latitude 35° , and the Gulf States to southwestern Arkansas and the valley of the Trinity River, Texas.

A tree 15 to 22 metres in height, with a trunk sometimes 1.20 metres in diameter, or toward its northern limits reduced to a low shrub; swamps or low wet woods, reaching its greatest development on the rich hummocks of the interior of the Florida peninsula, and along the low sandy banks of pine-barren streams in the Gulf States.

Wood light, soft, not strong, close-grained, compact; medullary rays very numerous, thin; color light brown tinged with red, the sap-wood

nearly white ; in the Gulf States sometimes used in the manufacture of small wooden-ware.

The dried bark, especially of the root, of this species and of *M. acuminata* and *M. Umbrella* are included in the American *Materia Medica*, furnishing an aromatic tonic and stimulant used in intermittent and remittent fevers.

3. *Magnolia acuminata*, L.

Cucumber Tree. Mountain Magnolia.

Western New York to southern Illinois ; southward along the Alleghany Mountains, and scattered through eastern and middle Kentucky and Tennessee, usually on Carboniferous deposits, to southern Alabama and northeastern Mississippi ; and in northeastern, southern, and southwestern Arkansas.

A large tree, 20 to 30 metres in height, with a trunk 0.60 to 1.20 metres in diameter ; rich woods, reaching its greatest development on the slopes of the southern Alleghany Mountains.

Wood durable, light, soft, not strong, close-grained, compact, satiny ; medullary rays numerous, thin ; color yellow-brown, the sap-wood lighter, often nearly white ; used for pump-logs, water-troughs, flooring, cabinet-making, etc.

4. *Magnolia cordata*, Michx.

Cucumber Tree.

Southern Alleghany Mountain region, — Georgia to Winston County, Alabama.

A tree 22 to 24 metres in height, with a trunk sometimes 0.60 metre in diameter ; low rich woods ; very rare and local.

Wood light, soft, not strong, close-grained, compact ; medullary rays very numerous, thin ; color light brown streaked with yellow, the sap-wood light yellow.

5. *Magnolia macrophylla*, Michx.

Large-leaved Cucumber Tree.

Western North Carolina to southeastern Kentucky, southward to middle and western Florida and southern Alabama, extending west to the valley of Pearl River, Louisiana ; and in central Arkansas.

A tree 6 to 18 metres in height, with a trunk rarely 0.60 metre in diameter ; rich woods, reaching its greatest development in the limestone valleys of northern Alabama ; rare and local.

Wood light, hard, not strong, close-grained, compact, satiny ; medullary rays numerous, thin ; color brown, the sap-wood light yellow.

6. Magnolia Umbrella, Lam.

Umbrella Tree. Elk-wood.

Southeastern Pennsylvania, southward along the Alleghany Mountains to central Alabama, westward through Kentucky and Tennessee to north-eastern Mississippi; and in central and southwestern Arkansas.

A small tree, rarely exceeding 12 metres in height, with a trunk 0.10 to 0.40 metre in diameter; rich, shady hillsides; most common and reaching its greatest development along the western slopes of the southern Alleghany Mountains.

Wood light, soft, not strong, close-grained, compact; medullary rays very numerous, thin; color brown, the heavier sap-wood nearly white.

7. Magnolia Fraseri, Walt.

Long-leaved Cucumber Tree.

Alleghany Mountains, from Virginia southward to western Florida and southern Alabama, extending west to the valley of Pearl River, Mississippi.

A small tree, 8 to 12 metres in height, with a trunk 0.15 to 0.20 metre in diameter; rich woods.

Wood light, soft, not strong, close-grained, compact; medullary rays very numerous, thin; color brown, the sap-wood nearly white.

8. Liriodendron Tulipifera, L.

Tulip Tree. Yellow Poplar. White-wood.

Southwestern Vermont, through western New England, southward to northern Florida; west through New York, Ontario, and Michigan to Lake Michigan, south of latitude $43^{\circ} 30'$; and south to latitude 31° in the Gulf States east of the Mississippi River; extending west to south-eastern Missouri and northeastern Arkansas.

A large and valuable tree, 30 to 60 metres in height, with a trunk 2 to 4 metres in diameter; rich woods and intervale lands, reaching its greatest development in the valley of the lower Wabash River and along the western slopes of the Alleghany Mountains in Tennessee and North Carolina.

Wood light, soft, not strong, brittle, very close straight-grained, compact, easily worked; medullary rays numerous, not prominent; color light yellow or brown, the thin sap-wood nearly white; largely manufactured into lumber, and used for construction, interior finish, shingles, in boat-building, and especially in the manufacture of wooden pumps, woodenware, etc.; varieties varying in color and grain are recognized.

Liriodendrin, a stimulant tonic, with diaphoretic properties, is obtained by macerating the inner bark, especially of the root.

ANONACEÆ.

9. *Asimina triloba*, Dunal.*Papaw. Custard Apple.*

Western New York, Ontario, eastern and central Pennsylvania to southern Michigan, southern Iowa, and eastern Kansas; south to middle Florida and the valley of the Sabine River, Texas.

A small tree, sometimes 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter, or often reduced to a slender shrub; rich, rather low woods, reaching its greatest development in the lower Wabash valley and in the valley of the White River, Arkansas.

Wood very light, very soft and weak, coarse-grained, spongy, layers of annual growth clearly marked by several rows of large open ducts; color light yellow shaded with green, the sap-wood lighter; the large fruit sweet and edible.

10. *Anona laurifolia*, Dunal.*Pond Apple.*

Semi-tropical Florida. — Cape Malabar to Bay Biscayne, west coast, Pease Creek to the Caloosa River; in the West Indies.

A small tree, sometimes 9 metres in height, with a trunk 0.30 metre in diameter, or toward its northern limits and on the west coast often reduced to a stout, wide-spreading shrub; common, and reaching its greatest development, within the United States, on the low islands and shores of the Everglades in the neighborhood of Bay Biscayne.

Wood light, soft, not strong, rather close-grained, compact, containing many scattered open ducts; color light brown streaked with yellow, the sap-wood lighter.

The large fruit scarcely edible.

CAPPARIDACEÆ.

11. *Capparis Jamaicensis*, Jacq.

Semi-tropical Florida. — Cape Canaveral to the southern keys; in the West Indies and southward to Brazil.

A small tree, sometimes 6 metres in height, with a trunk 0.15 metre in diameter, or reduced to a low shrub; common and reaching its greatest development, within the United States, on Upper Metacombe and Umbrella Keys.

Wood heavy, hard, close-grained, compact, satiny, containing many evenly distributed large open ducts; medullary rays numerous, obscure; color yellow tinged with red, the sap-wood lighter.

CANELLACEÆ.

12. *Canella alba*, Murr.

White-wood. Cinnamon Bark. Wild Cinnamon.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, often 10 metres in height, with a trunk 0.22 metre in diameter; not rare.

Wood very heavy, exceedingly hard, strong, close-grained, compact; medullary rays numerous, thin; color dark reddish-brown, the sap-wood light brown or yellow.

The pale inner bark furnishes an aromatic stimulant and tonic, occasionally employed in cases of debility of the digestive organs.

GUTTIFERÆ.

13. *Clusia flava*, L.

West Indies; Key West prior to 1840. Not rediscovered by the later explorers of the botany of semi-tropical Florida, and probably not now growing spontaneously within the limits of the United States.

Wood not examined.

TERNSTRÆMIACEÆ.

14. *Gordonia Lasianthus*, L.

Loblolly Bay. Tan Bay.

Southern Virginia, south, near the coast, to Cape Malabar, and Cape Romano, Florida, and along the Gulf coast to the valley of the Mississippi River.

A tree 15 to 24 metres in height, with a trunk often 0.45 to 0.50 metre in diameter; low, sandy swamps.

Wood light, soft, not strong, close-grained, compact, not durable; medullary rays numerous, thin; color light red, the sap-wood lighter; specific gravity, 0.4728; ash, 0.76; somewhat employed in cabinet-making.

15. *Gordonia pubescens*, L'Her.

Franklinia.

Near Fort Barrington, on the Altamaha River, Georgia.

A small tree, not rediscovered during the present century, and now only known through cultivated specimens.

Wood not examined.

STERCULIACEÆ.

16. *Fremontia Californica*, Torr.*Slippery Elm.*

California, — valley of Pitt River, southward along the western foothills of the Sierra Nevada, and in the Coast Ranges from the Santa Lucia to the San Jacinto Mountains; rare at the north, most common and reaching its greatest development on the southern Sierras and the San Gabriel and San Bernardino Ranges.

A small tree, 6 to 10 metres in height, the short trunk often 0.30 to 0.45 metre in diameter, or more often a tall, much branched shrub; dry, gravelly soil.

Wood heavy, hard, very close-grained, compact, satiny, containing many groups of small ducts parallel to the thin, conspicuous medullary rays; layers of annual growth obscure; color dark brown tinged with red, the thick sap-wood lighter.

The mucilaginous inner bark used locally in poultices.

TILIACEÆ.

17. *Tilia Americana*, L.*Lime Tree. Basswood. American Linden. Lin. Bee Tree.*

Northern New Brunswick, westward in British America to about the one hundred and second meridian, southward to Virginia and along the Alleghany Mountains to Georgia and southern Alabama; extending west, in the United States, to eastern Dakota, eastern Nebraska, eastern Kansas, the Indian Territory, and the valley of the San Antonio River, Texas.

A large tree, 20 to 24 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or, exceptionally, 30 to 45 metres in height, with a trunk 0.92 to 1.84 metres in diameter; common in all northern forests on rich soil; toward its western and southwestern limits only on bottomlands. A variety (*T. Americana*, var. *pubescens*, Loud) with thinner leaves softly pubescent beneath occasionally occurs in swamps and low ground from North Carolina to western Florida, generally near the coast.

Wood light, soft, not strong, very close-grained, compact, easily worked; medullary rays numerous, rather obscure; color light brown, or often slightly tinged with red, the sap-wood hardly distinguishable; largely used in the manufacture of wooden-ware and cheap furniture, for the panels and bodies of carriages, the inner soles of shoes, in turnery, and the manufacture of paper pulp.

The inner bark, macerated, is sometimes manufactured into coarse cordage and matting; the flowers, rich in honey, are highly prized by apiarists.

18. *Tilia heterophylla*, Vent.*White Basswood. Wahoo.*

Alleghany Mountains from Pennsylvania, southward to northern Alabama and Florida; west to middle Tennessee and Kentucky, southern Indiana, and southern and central Illinois.

A tree 15 to 20 metres in height, with a trunk 0.60 to 1.20 metres in diameter; rich woods and bottom-lands; most common and reaching its greatest development along the western slopes of the southern Alleghany Mountains and in middle Tennessee.

Wood light, soft, not strong, close-grained, compact, easily worked; medullary rays numerous, obscure; color light brown, the sap-wood hardly distinguishable; generally confounded with that of *Tilia Americana*, from which it scarcely differs.

The young branches are often fed to cattle in winter by farmers in the southern Alleghany Mountains.

MALPIGHIACEÆ.

19. *Byrsonima lucida*, HBK.*Tallow Berry. Glamberry.*

Southern keys of semi-tropical Florida; through the West Indies.

A small tree, sometimes 6 to 8 metres in height, with a trunk 0.15 to 0.25 metre in diameter, or often shrubby and branching from the ground.

Wood light, soft, weak, close-grained, compact; medullary rays numerous, thin; color light red, the sap-wood a little lighter.

Fruit edible.

ZYGOPHYLLACEÆ.

20. *Guaiacum sanctum*, L.*Lignumvitæ.*

Keys of semi-tropical Florida, not rare; in the Bahamas, St. Domingo, Cuba, Porto Rico, etc.

A low, gnarled tree, not exceeding, within the limits of the United States, 8 metres in height, with a trunk sometimes 0.30 metre in diameter.

Wood exceedingly heavy, very hard, strong, brittle, close-grained, compact, difficult to work, splitting irregularly, containing many evenly distributed resinous ducts; medullary rays numerous, obscure; color rich yellow-brown, varying in older specimens to almost black, the sap-wood light yellow; used in turnery and for the sheaves of ships' blocks, for which it is preferred to other woods.

Lignum Guaiaci, *Guaiacum-wood*, the heart of this and the allied *G. officinale*, formerly largely used in the treatment of syphilis, is now

only retained in the *Materia Medica* as an ingredient in the compound decoction of sarsaparilla.

Guaiac, the resinous gum obtained from these species, is a stimulating diaphoretic and alterative, or in large doses cathartic, and is employed in cases of chronic rheumatism, gout, etc.

21. *Porliera angustifolia*, Gray.

Western Texas, — valley of the Colorado River to the Rio Grande, extending west to the Rio Pecos; in northern Mexico.

A small tree, 8 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or toward its eastern, northern, and western limits reduced to a low shrub; reaching its greatest development, in the United States, on the hills bordering the valley of the Guadalupe River.

Wood exceedingly heavy, very hard, close-grained, compact, the open ducts smaller and less regularly distributed than in *Guaiacum*; medullary rays very thin, numerous; color rich dark brown, turning green with exposure, the sap-wood bright yellow; probably possessing medicinal properties similar to those of *lignumvitæ*.

RUTACEÆ.

22. *Xanthoxylum Americanum*, Mill.

Prickly Ash. Toothache Tree.

Eastern Massachusetts, west to northern Minnesota, eastern Nebraska, and eastern Kansas; south to the mountains of Virginia, and northern Missouri.

A small tree, not often 7 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or, reduced to a shrub, 1.50 to 1.80 metres in height; common, and reaching its greatest development in the region of the great lakes; rocky hillsides, or more often along streams and rich bottom-lands.

Wood light, soft, coarse-grained; medullary rays numerous, thin; color light brown, the sap-wood lighter.

The bark of *Xanthoxylum*, an active stimulant, is used in decoction to produce diaphoresis in cases of rheumatism, syphilis, etc., and as a popular remedy for toothache.

23. *Xanthoxylum Clava-Herculis*, L.

Toothache Tree. Prickly Ash. Sea Ash. Pepper-wood. Wild Orange.

Southern Virginia, southward near the coast to Bay Biscayne and Tampa Bay, Florida, westward through the Gulf States to northwestern Louisiana, southern Arkansas, and the valley of the Brazos River, Texas.

A small tree, rarely 12 to 14 metres in height, with a trunk 0.30 metre in diameter; usually along streams and low, rich bottom-lands, reaching

its greatest development in southern Arkansas, Louisiana, and eastern Texas. A shrubby, or on the coast arborescent, form of western Texas, with shorter ovate leaves, is var. *fruticosum*, Gray.

Wood light, hard, not strong, soft, coarse-grained, not durable, containing many scattered open ducts; medullary rays numerous, thin; color light brown, the sap-wood lighter.

24. *Xanthoxylum Caribæum*, Lam.

Satin-wood.

Keys of semi-tropical Florida; in the West Indies.

A small tree, 6 to 10 metres in height, with a trunk 0.30 to 0.40 metre in diameter; not common.

Wood very heavy, exceedingly hard, not strong, brittle, fine-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, thin, conspicuous; color light orange, the sap-wood lighter.

25. *Xanthoxylum Pterota*, HBK.

Wild Lime.

Semi-tropical Florida, — Mosquito Inlet to the southern keys, and on the west coast from about latitude 29° to Cape Sable; southwestern Texas; and southward through Mexico to Brazil.

A small tree, sometimes 8 metres in height, with a trunk rarely exceeding 0.15 metre in diameter, or often reduced to a slender shrub. In Florida common, and reaching its greatest development on the keys of the west coast; in Texas not common, but widely distributed as a small shrub, or, on the shores of Matagorda Bay, west of the Nueces River, and in the valley of the Rio Grande, a low tree.

Wood heavy, hard, close-grained, compact; medullary rays thin, numerous; color brown tinged with red, the sap-wood yellow.

26. *Ptelea trifoliata*, L.

Hop Tree. Shrubby Trefoil. Wafer Ash.

Banks of the Niagara River, and Pennsylvania southward to northern Florida, west to Minnesota and the Indian Territory; through western Texas to New Mexico; in northern Mexico.

A small tree, sometimes 4 to 6 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or more often reduced to a slender shrub; shady, rocky hillsides.

A variety with more or less pubescent leaves, not rare on the south Atlantic coast, and the common form of western Texas, is var. *mollis*, Torr. & Gray.

Wood heavy, hard, close-grained, compact, satiny, layers of annual growth clearly marked by two or three rows of open ducts; medullary rays few, thin; color yellow-brown, the sap-wood hardly distinguishable.

The bark of the root possesses tonic properties, and is employed by herbalists in the form of tinctures and fluid extracts in the treatment of dyspepsia, debility, etc.; the bitter fruit is occasionally used domestically as a substitute for hops.

27. *Canotia holacantha*, Torr.

Arizona, — White Mountain region, valley of the Gila River, valley of Bill Williams Fork.

A small tree, 6 to 8 metres in height, with a trunk sometimes 0.30 metre in diameter, or often a large shrub; dry, rocky hillsides.

Wood heavy, hard, very close-grained, compact, satiny; medullary rays thin, obscure; color light brown tinged with red, the sap-wood lighter brown.

SIMARUBEÆ.

28. *Simaruba glauca*, DC.

Paradise Tree.

Semi-tropical Florida, — Cape Canaveral to the southern keys; through the West Indies to Brazil.

A tree sometimes 15 metres in height, with a trunk 0.60 metre in diameter; within the United States not common, and reaching its greatest development on the shores of Bay Biscayne.

Wood light, soft, not strong, coarse-grained, containing many large scattered open ducts; medullary rays few, thin; color light brown, the sap-wood a little darker.

The bark of this species is occasionally used as a substitute for that of *S. officinalis*, DC., as an aromatic, bitter tonic.

BURSERACEÆ.

29. *Bursera gummifera*, Jacq.

Gum Elemi. Gumbo Limbo. West Indian Birch.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast Caloosa River to Caximbas Bay; in the West Indies.

A tree often 18 metres in height, with a trunk 0.50 to 0.70 metre in diameter; one of the largest and most common trees of southern Florida, of very rapid growth and decay.

Wood very light, exceedingly soft and weak, spongy, containing many scattered open ducts; medullary rays numerous, thin; color light brown or gray, quickly discoloring with decay.

The aromatic resin obtained from this species was formerly somewhat used in various forms, under the name of *Caranna*, as a remedy for gout; and in the West Indies is manufactured into a valuable varnish.

30. *Amyris sylvatica*, Jacq.*Torch-wood.*

Semi-tropical Florida, — Mosquito Inlet to the southern keys; in the West Indies.

A small tree, sometimes 7 metres in height, with a trunk 0.20 to 0.25 metre in diameter; common.

Wood very heavy, exceedingly hard and strong, close-grained, compact, resinous, exceedingly durable, susceptible of a beautiful polish; medullary rays obscure; color light orange, the sap-wood lighter.

MELIACEÆ.

31. *Swietenia Mahogoni*, L.*Mahogany. Madeira.*

Southern keys of semi-tropical Florida; rare; in the West Indies and Central America.

A large tree, on the Florida keys rarely exceeding 15 metres in height, with a trunk sometimes 0.90 metre in diameter.

Wood heavy, exceedingly hard, very strong, brittle, very close-grained, compact, very durable, susceptible of a high polish; medullary rays numerous, obscure; color rich reddish-brown, turning darker with age, the thin sap-wood yellow; varying greatly in quality in different regions; largely used and preferred to all other woods for cabinet-making of all sorts, interior finish, etc.; formerly somewhat employed in ship-building.

OLACINEÆ.

32. *Ximenia Americana*, L.*Wild Lime. Tallow Nut. Hog Plum. Mountain Plum.*

Florida, — east coast Saint John's River to the southern keys, west coast Caloosa River to Caximbas Bay; through the West Indies to Brazil, and on the coast of the Indian Peninsula (introduced?).

A small, low, wide-spreading tree, rarely exceeding 4 metres in height, with a trunk 0.15 metre in diameter, or in pine-barren soil and toward its northern limits reduced to a low shrub; common and reaching its greatest development, in Florida on the west coast.

Wood very heavy, tough, hard, close-grained, compact, containing numerous regularly distributed open ducts; medullary rays few, thin; color brown tinged with red, the sap-wood lighter.

Hydrocyanic acid can be obtained from the edible plum-shaped fruit.

ILICINÆ.

33. *Ilex opaca*, Ait.*American Holly.*

Quincy, Massachusetts, southward, near the coast, to Mosquito Inlet and Charlotte Harbor, Florida, through the Gulf States to the valley of the Colorado River, Texas, and extending northward through the Mississippi Valley to Southern Indiana.

An evergreen tree, sometimes 15 metres in height, with a trunk 0.30 to 1.20 metres in diameter, or toward its northern limits reduced to a shrub; generally in low, rather moist soil; most common and reaching its greatest development in the rich bottom-lands of southern Arkansas and eastern Texas.

Wood light, soft, not strong, tough, rather hard, close-grained, very compact, easily worked; medullary rays numerous, inconspicuous; color nearly white, turning to light brown with exposure, the sap-wood still lighter; used and admirably adapted for cabinet work, interior finish, and turnery.

A bitter principle (*Ilicin*), common to other species of the genus, has been obtained from the fruit of this tree.

34. *Ilex Dahoon*, Walt.*Dahoon. Dahoon Holly.*

Southern Virginia, southward near the coast to Mosquito Inlet and Tampa Bay, Florida, and west along the Gulf coast to the prairie region of western Louisiana.

A small tree, sometimes 8 metres in height, with a trunk from 0.20 to 0.30 metre in diameter; low, wet soil, or often in cypress swamps and ponds; not common, and running into numerous forms, — var. *angustifolia*, Torr. & Gray; var. *myrtifolia*, Chapm.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood nearly white.

35. *Ilex Cassine*, Walt.*Cassena. Yaupon. Yopon.*

Southern Virginia, southward, near the coast, to Saint John's River and Cedar Keys, Florida, west along the Gulf coast to southern Arkansas, and the valley of the Colorado River, Texas.

A small tree, 6 to 8 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or more often a shrub, sending up many slender stems and forming dense thickets; sandy, moist soil, along ponds and streams; reaching its greatest development on the bottom-lands of eastern Texas.

Wood heavy, hard, close-grained, liable to check in drying ; medullary rays numerous, conspicuous ; color nearly white, becoming yellow with exposure, the sap-wood lighter.

The leaves possess powerful emetic properties.

36. *Ilex decidua*, Walt.

Southern Virginia, southward, through the middle districts, to western Florida ; through the Gulf States to the valley of the Colorado River, Texas, and northward through the Mississippi Valley to southern Illinois.

A small tree, 8 to 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or in the Atlantic States a tall, straggling shrub ; low, wet woods along streams, reaching its greatest development in the Iron Mountain region of Missouri, and in southern Arkansas.

Wood heavy, hard, close-grained, compact ; medullary rays numerous, thin ; color creamy-white, the sap-wood lighter.

CYRILLACEÆ.

37. *Cyrilla racemiflora*, L.

Iron-wood.

North Carolina, southward, near the coast, to middle Florida, and west, along the Gulf coast, to the valley of the Pearl River, Mississippi.

A small tree, sometimes 8 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a tall shrub, sending up many stems from the root ; open swamps, low thickets, or pine-barren pond-holes.

Wood heavy, weak, hard, close-grained, compact ; medullary rays thin, not conspicuous ; color brown tinged with red, the sap-wood a little lighter.

38. *Cliftonia ligustrina*, Banks.

Titi. Iron-wood. Buckwheat Tree.

Valley of the Savannah River, Georgia, south to middle Florida, and west, along the Gulf coast, to the valley of the Pearl River, Louisiana.

A small tree, sometimes 12 metres in height, with a trunk 0.30 to 0.40 metre in diameter, or toward its southern limits in Florida reduced to a shrub ; margins of pine-barren ponds and streams.

Wood heavy, soft, not strong, close-grained, compact ; medullary rays numerous, thin ; color brown tinged with red, the sap-wood lighter ; largely used as fuel, burning with a clear flame.

CELASTRACEÆ.

39. *Euonymus atropurpureus*, Jacq.*Burning Bush. Wahoo. Spindle Tree. Arrow-wood.*

Western New York, west to the valley of the Missouri River, Montana, southward to northern Florida, southern Arkansas, and eastern Kansas.

A small tree, rarely 6 to 8 metres in height, with a trunk 0.15 metre in diameter, or more often a shrub 2 to 3 metres in height; low, rich woods, reaching its greatest development west of the Mississippi River.

Wood heavy, very close-grained, liable to check badly in seasoning; medullary rays hardly distinguishable; color white tinged with orange.

Wahoo bark, a mild but uncertain purgative, is used by herbalists in the form of decoctions, tinctures, fluid extracts, etc.

40. *Myginda pallens*, Smith.

Upper Metacombe Key, Florida; in the West Indies.

A small tree, rarely exceeding 4 metres in height, with a trunk 0.15 metre in diameter.

Wood very heavy, hard, very close-grained, compact, satiny; layers of annual growth and numerous medullary rays hardly distinguishable; color dark brown or nearly black, the thick sap-wood lighter brown tinged with red.

41. *Schæfferia frutescens*, Jacq.*Yellowwood. Box-wood.*

Semi-tropical Florida, — southern keys from Metacombe Key eastward, Caloosa River, and sparingly on the Reef Keys; in the West Indies.

A small tree, occasionally 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, generally hollow and defective.

Wood heavy, hard, close-grained, compact, susceptible of a high polish; medullary rays numerous, obscure; color light bright yellow, the sap-wood a little lighter.

RHAMNACEÆ.

42. *Reynosia latifolia*, Griseb.*Red Iron-wood. Darling Plum.*

Semi-tropical Florida, — southern keys to Bay Biscayne; in the West Indies.

A small tree, sometimes 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter.

Wood heavy, exceedingly hard, strong, close-grained, compact; medullary rays numerous, thin; color rich dark brown, the sap-wood light brown.

The fruit edible and of agreeable flavor.

43. *Condalia ferrea*, Griseb.

Black Iron-wood.

Semi-tropical Florida, — Cape Canaveral to Bay Biscayne, and on the southern keys; in the West Indies.

A small tree, sometimes 11 metres in height, with a trunk 0.25 to 0.38 metre in diameter, generally hollow and defective; common.

Wood exceedingly heavy and hard, strong, brittle, close-grained, compact, difficult to work; remarkable for the large percentage of ash; medullary rays very numerous, thin; color rich orange-brown, the sap-wood lighter.

44. *Condalia obovata*, Hook.

Blue-wood. Logwood. Purple Haw.

Eastern and southwestern Texas, westward through southern New Mexico to southern Arizona; probably extending into northern Mexico.

A small tree, 6 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a low, much branched shrub; reaching its greatest development along the streams of eastern Texas; one of the common "chaparral" plants of western Texas, here forming dense, impenetrable thickets.

Wood very heavy, hard, close-grained, liable to check in seasoning, containing many groups of large irregularly arranged open ducts; medullary rays numerous, obscure; color light red, the sap-wood light yellow.

45. *Rhamnus Caroliniana*, Walt.

Indian Cherry.

Long Island, New York, west along the valley of the Ohio River to southern Illinois, Missouri south of the Meramec River, eastern Kansas, and the Indian Territory, south to northern Florida, and through the Gulf States to eastern Texas.

A small tree, 6 to 10 metres in height, with a trunk 0.20 to 0.30 metre in diameter, or in the Atlantic States generally a tall shrub; rich woods along streams and bottom-lands; reaching its greatest development in southern Arkansas and eastern Texas.

Wood light, hard, not strong, coarse-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood lighter.

The fruit sweet and edible.

46. *Rhamnus Californica*, Eschsch.

California, west of the Sierra Nevadas, from the valley of the upper Sacramento River southward to Santa Barbara and Fort Tejon.

A small tree, rarely 7 to 9 metres in height, with a trunk 0.30 to 0.37 metre in diameter, or commonly a shrub, along the sea-coast and at high elevations, often prostrate; common and reaching its greatest development in the valleys of the Santa Cruz Mountains. A low shrubby form, densely white-tomentose, especially on the under side of the leaves, of southern California, Arizona, and New Mexico, is var. *tomentella*, Brewer & Watson.

Wood light, soft, rather coarse-grained, checking in drying; layers of annual growth marked by many rows of open ducts; medullary rays narrow, obscure; color brown or light yellow, the sap-wood lighter.

47. *Rhamnus Purshiana*, DC.

Bearberry. Bear-wood. Shittim-wood.

Puget Sound, east along the mountain ranges of northern Washington to the Bitter Root Mountains, Idaho, and the shores of Flathead Lake, Montana; southward through western Washington, Oregon, and northern California, west of the Sierra Nevada Mountains.

A small tree, often 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter; depressions and on the sides and bottoms of cañons in the coniferous forests; reaching its greatest development along the western slope of the Coast Range of southern Oregon.

Wood light, very hard, not strong, close-grained, compact, satiny; medullary rays numerous, thin; color light brown tinged with yellow, the sap-wood somewhat lighter.

The bark, like that of other species of the genus, possesses powerful cathartic properties, and, under the name of *Cascara sagrada*, has been introduced into commerce by herbalists in the form of fluid extracts and tinctures.

48. *Ceanothus thyrsiflorus*, Eschsch.

Blue Myrtle.

California, — Coast Ranges, from Mendocino County south to the valley of the San Luis Rey River.

A small tree, 8 to 10 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or toward the southern limits reduced to a low shrub; common and reaching its greatest development in the *Sequoia* forests near Santa Cruz Bay.

Wood light, soft, close-grained, compact; medullary rays very obscure; color light brown, the sap-wood darker.

The bark of the root may be expected to possess similar astringent properties to that of the shrubby *C. Americana*, used with advantage in cases of diarrhoea and dysentery, and as a domestic remedy in the treatment of troubles of the throat.

49. *Colubrina reclinata*, Brong.

Naked Wood.

Southern keys of semi-tropical Florida; in the West Indies.

One of the largest trees of the region, deciduous, 12 to 18 metres in height, with a trunk 0.60 to 1.25 metres in diameter; reaching its greatest development, within the United States, on Umbrella Key, here forming a dense forest; not common.

Wood heavy, hard, very strong, brittle, close-grained, compact, satiny, susceptible of a good polish, containing many small open ducts; medullary rays numerous, thin; color dark brown tinged with yellow, the sap-wood light yellow.

SAPINDACEÆ.

50. *Æsculus glabra*, Willd.

Ohio Buckeye. Fetid Buckeye.

Western slopes of the Alleghany Mountains from Pennsylvania to northern Alabama, and westward through southern Michigan (rare) to southern Iowa, eastern Kansas, and the Indian Territory.

A small tree, 8 to 15 metres in height, with a trunk 0.30 to 0.60 metre in diameter; rich soil along streams and bottom-lands; reaching its greatest development in the high valleys of the southern Alleghany Mountains.

Wood light, soft, not strong, close-grained, compact, difficult to split, often blemished by dark lines of decay; medullary rays obscure; color white, the sap-wood a little darker; largely used, in common with that of the other species of the genus, in the manufacture of wooden-ware, artificial limbs, paper pulp, wooden hats, less commonly for the bearings of shafting and machinery, and occasionally manufactured into lumber.

The bark of the allied old-world species *Æ. Hippocastanum* has been found efficacious as a substitute for *cinchona* bark in the treatment of intermittent fevers, and similar properties may be looked for in the bark of the North American species of this genus.

51. *Æsculus flava*, Ait.

Sweet Buckeye.

Alleghany Mountains from Pennsylvania to northern Georgia and Alabama, west to southern Iowa, the Indian Territory, and the valley of the Brazos River, Texas.

A tree 18 to 28 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or toward its southwestern limits reduced to a shrub; rich woods and borders of streams; reaching its greatest development on the slopes of the Alleghany Mountains of North Carolina and Tennessee.

A variety with purple or flesh-colored flowers, the leaflets pubescent beneath, is var. *purpurascens*, Gray.

Wood light, soft, close-grained, compact, difficult to split; medullary rays numerous, obscure; color creamy-white, the sap-wood hardly distinguishable.

52. *Æsculus Californica*, Nutt.

California Buckeye.

California, — valley of the upper Sacramento River and Mendocino County, southward in the Coast Ranges to San Luis Obispo, and along the western foot-hills of the Sierra Nevada Mountains.

A low, widely branching tree, 8 to 12 metres in height, with a short trunk 0.60 to 0.90 metre in diameter, often greatly expanded at the base, or more often a much-branched shrub from 3 to 5 metres in height; borders of streams, reaching its greatest development in the cañons of the Coast Ranges north of San Francisco Bay.

Wood light, soft, not strong, very close-grained, compact; medullary rays numerous, obscure; color white slightly tinged with yellow, the sap-wood hardly distinguishable.

53. *Ungnadia speciosa*, Endl.

Spanish Buckeye.

Valley of the Trinity River, Texas, to the cañons of the Organ Mountains, New Mexico; and southward into Mexico.

A small tree, sometimes 6 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or towards its eastern and western limits reduced to a low shrub; common west of the Colorado River, on bottoms and rich hillsides, and reaching its greatest development in the valley of the Guadalupe River, between New Braunfels and the coast.

Wood heavy, soft, not strong, close-grained, compact, satiny, containing numerous evenly distributed open ducts; medullary rays numerous, inconspicuous; color red tinged with brown, the sap-wood lighter.

54. *Sapindus marginatus*, Willd.

Wild China. Soapberry.

Atlantic coast, — Savannah River to the Saint John's River, Florida; Cedar Keys; valley of the Washita River, Arkansas, through western Louisiana, and Texas to the mountain valleys of southern New Mexico and Arizona, and southward into Mexico; in the West Indies.

A tree on the Atlantic coast, sometimes 15 to 18 metres in height, with a trunk rarely 0.60 metre in diameter, west of the Colorado River much smaller, rarely 9 metres in height; borders of streams or toward the western limits of its distribution, only in mountain valleys; reaching its greatest development on the bottom-lands of eastern Texas.

Wood heavy, strong, hard, close-grained, compact, easily split into thin strips; layers of annual growth clearly marked by several rows of large open ducts; medullary rays thin, obscure; color light brown tinged with yellow, the sap-wood lighter; largely used in Texas in the manufacture of cotton-baskets, and in New Mexico for the frames of pack-saddles.

55. *Sapindus Saponaria*, L.

Soapberry.

Semi-tropical Florida, — Bay Biscayne to Caximbas Bay; in the West Indies.

A small tree, 6 to 10 metres in height, with a trunk sometimes 0.38 metre in diameter; common on Cape Sable, and reaching its greatest development, within the United States, on the Thousand Islands and along the shores of Caximbas Bay.

Wood heavy, rather hard, close-grained, compact; medullary rays numerous, thin; color light brown tinged with yellow, the sap-wood yellow.

The fruit and roots rich in *saponin*, and used in the West Indies as a substitute for soap; the round black seeds for beads, buttons, and small ornaments.

56. *Hypelate paniculata*, Cambess.

Ink-wood. Iron-wood.

Semi-tropical Florida, — east coast from Mosquito Inlet to the southern keys; in the West Indies.

A tree often 12 metres in height, with a trunk 0.45 metre in diameter.

Wood very heavy, exceedingly hard, very strong, close-grained, susceptible of a good polish, checking in drying; medullary rays obscure; color bright reddish brown, the sap-wood lighter; used in ship-building, for the handles of tools, and wharf piles; resisting the attacks of the *Teredo*.

57. *Hypelate trifoliata*, Sw.

White Iron-wood.

Southern keys of semi-tropical Florida; in the West Indies.

A tree sometimes 12 metres in height, with a trunk 0.45 to 0.60 metre in diameter; not common.

Wood very heavy, hard, close-grained, compact, susceptible of a fine polish, durable in contact with the soil; medullary rays thin, obscure; color rich light brown, the sap-wood darker; used in ship-building, for the handles of tools, posts, etc.

58. *Acer Pennsylvanicum*, L.

Striped Maple. Moose-wood. Striped Dogwood. Goose-foot Maple. Whistle-wood.

Valley of the Saint Lawrence River to the northern shores of Lake Ontario, and the islands of Lake Huron, south through the north Atlantic States, and along the Alleghany Mountains to northern Georgia; west through the lake region to northeastern Minnesota.

A small tree, 6 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter; cool ravines and mountain sides.

Wood light, soft, close-grained, compact, satiny; medullary rays numerous, thin; color light brown, the sap-wood lighter.

59. *Acer spicatum*, Lam.

Mountain Maple.

Valley of the Saint Lawrence River, west along the northern shores of the great lakes to northern Minnesota and the Saskatchewan region, south through the northern States and along the Alleghany Mountains to northern Georgia.

A small tree, sometimes 8 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a tall shrub; cool woods and mountain ravines; reaching its greatest development on the western slopes of the Alleghany Mountains of North Carolina and Tennessee.

Wood light, soft, close-grained, compact; medullary rays inconspicuous; color light brown tinged with red, the sap-wood lighter.

60. *Acer macrophyllum*, Pursh.

Broad-leaved Maple.

Coast of Alaska, from latitude 55° south along the islands and coast of British Columbia, through western Washington and Oregon, and along the California Coast Ranges and western slopes of the Sierra Nevada to the San Bernardino Mountains and Hot Spring Valley, San Diego County; not found above 4,000 feet altitude.

A tree 24 to 30 metres in height, with a trunk 1.20 to 1.50 metres in diameter; borders of streams; reaching its greatest development on the rich bottom-lands of the Coquille and other rivers of southern Oregon.

Wood light, soft, not strong, close-grained, compact, easily worked, susceptible of a good polish; medullary rays numerous, thin; color rich light brown tinged with red, the sap-wood lighter, often nearly white; largely used in Oregon in the manufacture of furniture, for axe and broom handles, frames of snow-shoes, etc.; specimens with the grain beautifully curled and contorted are common.

61. *Acer circinatum*, Pursh.*Vine Maple.*

Valley of the Fraser River and probably farther north in British Columbia, southward through Washington and Oregon, west of the Cascade Mountains to the Mount Shasta region of northern California; rarely found above 4,000 feet altitude.

A small tree, sometimes 8 to 12 metres in height, with a trunk 0.20 to 0.30 metre in diameter; borders of streams; the stems often prostrate and forming dense, impenetrable thickets.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, thin; color light brown or often nearly white; the sap-wood lighter; specific gravity, 0.6660; ash, 0.39; used as fuel, by lumbermen for axe and shovel handles, and by the coast Indians for the bows of fishing-nets.

62. *Acer glabrum*, Torr.*Dwarf Maple.*

Valley of the Fraser River and probably farther north in British Columbia, south through Washington, Oregon, and along the Sierra Nevada Mountains of California to the Yosemite Valley; east along the mountain ranges of Idaho and Montana to the eastern base of the Rocky Mountains, south through Colorado and Utah; in the east Humboldt Range, Nevada, and in the mountain ranges of western New Mexico and eastern Arizona.

A small tree, 8 to 12 metres in height, with a trunk sometimes 0.30 metre in diameter, or more often reduced to a low shrub 1 to 2 metres in height; borders of streams, reaching its greatest development in the mountain cañons of western New Mexico and eastern Arizona.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin; color light brown, or often nearly white, the sap-wood lighter.

63. *Acer grandidentatum*, Nutt.

Western Montana, cañons of the Wahsatch Mountains, Utah, and south through eastern Arizona to southwestern New Mexico; and in Coahuila.

A small tree, rarely exceeding 10 metres in height, with a trunk 0.20 to 0.25 metre in diameter; borders of streams; not common.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin, distinct; color light brown, or often nearly white.

64. *Acer saccharinum*, Wang.*Sugar Maple. Sugar Tree. Hard Maple.*

Southern Newfoundland, valleys of the Saint Lawrence and Saguenay Rivers, shores of Lake Saint John, west along the northern shores of the

great lakes to Lake of the Woods; south through the northern States and along the Alleghany Mountains to northern Alabama and western Florida; west to Minnesota, eastern Nebraska, eastern Kansas, and eastern Texas.

A tree of great economic value, 24 to 36 metres in height, with a trunk 0.60 to 1.20 metres in diameter, or towards its southwestern limits greatly reduced in size; rich upland woods; often forming extensive forests, and reaching its greatest development in the region of the great lakes. A form with more widely lobed leaves, often downy on the lower side, common along the borders of streams and on bottom-lands from western Vermont to southern Missouri, extending south to northern Alabama and southwestern Arkansas, is var. *nigrum*, Gray.

Wood heavy, hard, strong, tough, close-grained, compact, susceptible of a good polish; medullary rays numerous, thin; color light brown tinged with red, the sap-wood lighter; largely used in the manufacture of furniture, shoe lasts and pegs, saddle-trees, in turnery, for interior finish and flooring; in ship-building for keels, keelsons, shoes, etc., and furnishing valuable fuel; "curled" maple and "bird's-eye" maple, accidental forms in which the grain is beautifully curled and contorted, are common and highly prized in cabinet-making.

Maple sugar is principally made from this species; the ashes of the wood, rich in alkali, yield large quantities of potash.

65. *Acer dasycarpum*, Ehrh.

Soft Maple. White Maple. Silver Maple.

Valley of the Saint John River, New Brunswick, to southern Ontario, south to western Florida, west to eastern Dakota, eastern Nebraska, the valley of the Blue River, Kansas, and the Indian Territory.

A large tree, 18 to 30 or, exceptionally, 36 metres in height, with a trunk 1.20 to 1.80 metres in diameter, borders of streams and intervalles, in rich soil; most common west of the Alleghany Mountains, and reaching its greatest development in the basin of the lower Ohio River.

Wood light, hard, strong, brittle, close-grained, compact, easily worked; medullary rays numerous, thin; somewhat used in the manufacture of cheap furniture, for flooring, etc. Maple sugar is occasionally made from this species.

66. *Acer rubrum*, L.

Red Maple. Swamp Maple. Soft Maple. Water Maple.

New Brunswick, Quebec, and Ontario south of latitude 49°, north and west to the Lake of the Woods, south to Indian and Caloosa Rivers, Florida; west to eastern Dakota, eastern Nebraska, the Indian Territory, and the valley of the Trinity River, Texas.

A large tree, 20 to 30 or, exceptionally, 32 metres in height, with a trunk 0.90 to 1.50 metres in diameter; borders of streams and low, wet

swamps, reaching its greatest development in the valleys of the lower Wabash and Yazoo Rivers. A form common in southern Arkansas, eastern Texas, western Louisiana, and sparingly through the Gulf States to southern Georgia, and well characterized by its obovate or truncate leaves, densely covered, as well as the petioles and young shoots, with a thick white tomentum, is var. *Drummondii*, Sargent.

Wood heavy, hard, not strong, close-grained, compact, easily worked; medullary rays numerous, obscure; color brown, often tinged with red, the sap-wood lighter; largely used in cabinet-making, turnery, and for wooden-ware, gunstocks, etc.

67. *Negundo aceroides*, Moench.

Box Elder. Ash-leaved Maple.

Shores of the Winooski River and Lake Champlain, Vermont, near Ithaca, New York, eastern Pennsylvania, and south to Hernando County, Florida; northwest through the lake region of the United States and Manitoba to Lake Winnipeg, and along the southern branch of the Saskatchewan to the eastern base of the Rocky Mountains; west, in the United States, to the eastern slopes of the Rocky Mountains of Montana, and the Wahsatch Mountains, Utah; southwest through the basin of the Mississippi River, western Texas, and New Mexico to eastern Arizona; and southward into Mexico.

A tree 15 to 22 metres in height, with a trunk 0.60 to 0.90 metre, or, exceptionally, 1.20 metres in diameter; moist soil, borders of streams, etc.; in the Rocky Mountain region in high valleys, between 5,000 and 6,000 feet elevation; one of the most widely distributed trees of the American forest, reaching its greatest development in the valleys of the Wabash and Cumberland Rivers.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color creamy-white, the sap-wood hardly distinguishable; occasionally used in the interior finish of houses, for wooden-ware, cooperage, and paper-pulp.

Small quantities of maple sugar are sometimes obtained from this species.

68. *Negundo Californicum*, Torr. & Gray.

Box Elder.

California, — valley of the lower Sacramento River, southward in the interior valleys of the Coast Ranges to the western slopes of the San Bernardino Mountains.

A small tree, 6 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter; borders of streams.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color nearly white, or slightly tinged with yellow; occasionally used in the manufacture of cheap furniture.

ANACARDIACEÆ.

69. *Rhus cotinoides*, Nutt.*Chittam-wood.*

Alabama, — southern slopes of the Cumberland Mountains, north of the Tennessee River; and doubtfully reported north of the Alabama line, in Tennessee. Indian Territory, rocky banks of the Grand River (*Nuttall*).

In Alabama, a small wide-branching tree, 9 to 10 metres in height, with a trunk sometimes 0.30 metre in diameter, on limestone benches between 700 and 900 feet elevation, in dense forests of oak, ash, maple, etc.; local and very rare; not rediscovered in Arkansas or the Indian Territory; in Alabama nearly exterminated.

Wood light, soft, rather coarse-grained, checking badly in drying, very durable in contact with the soil; layers of annual growth marked by several rows of large open ducts; medullary rays numerous, very obscure; color bright, clear, rich orange, the thin sap-wood nearly white; largely used locally for fencing, and yielding a clear orange dye.

70. *Rhus typhina*, L.*Staghorn Sumach.*

New Brunswick, west through the valley of the Saint Lawrence River to southern Ontario and Minnesota, south through the northern States and along the Alleghany Mountains to northern Georgia, central Alabama and Mississippi.

A small tree, rarely 9 metres in height, with a trunk 0.15 to 0.30 metre in diameter, or often a shrub; dry hillsides, or often along streams in sandy, moist soil.

Wood light, brittle, soft, coarse-grained, compact, satiny, taking a good polish; layers of annual growth clearly marked by four to six rows of large open ducts; medullary rays numerous, obscure; color yellow streaked with green, the sap-wood nearly white; occasionally used for inlaying cabinet work.

Bark and leaves, astringent, and rich in tannin, are somewhat used locally as a dye and in dressing skins.

71. *Rhus copallina*, L.*Dwarf Sumach.*

Northern New England, south to Manatee and Caximbas Bay, Florida, west to Missouri, Arkansas, and the valley of the San Antonio River, Texas.

A small tree, 6 to 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or at the north a low shrub 1 to 2 metres in height; dry hills

and ridges; reaching its greatest development in southern Arkansas and eastern Texas; running into various forms (var. *lanceolata*, Gray; var. *leucantha*, DC.).

Wood light, soft, not strong, coarse-grained, compact, satiny, susceptible of a good polish; layers of annual growth clearly marked by several rows of large open ducts; medullary rays thin, not prominent; color light brown, streaked with green, or often tinged with red; the sap-wood lighter.

Leaves and bark astringent, rich in tannin; the leaves largely collected, principally in Maryland, Virginia, West Virginia, and Tennessee, and ground for tanning and dyeing.

72. *Rhus venenata*, DC.

Poison Sumach. Poison Elder.

Northern New England, south to northern Georgia, Alabama, and western Louisiana, west to northern Minnesota, Missouri, and Arkansas.

A small tree, 6 to 8 metres in height, with a trunk sometimes 0.15 to 0.20 metre in diameter, or more often a tall shrub; low, wet swamps, or more rarely on higher ground.

Wood light, soft, coarse-grained, moderately compact; layers of annual growth clearly marked by three or four rows of large open ducts; medullary rays thin, very obscure; color light yellow streaked with brown, the sap-wood lighter.

The whole plant, as well as the allied *R. Toxicodendron*, is exceedingly poisonous to most persons, owing to the presence of a volatile principle, *Toxicodendric acid*; the white milky sap, turning black in drying, yields a valuable lacquer.

73. *Rhus Metopium*, L.

*Poison-wood. Coral Sumach. Mountain Manchineel. Bum-wood.
Hog Plum. Doctor-gum.*

Semi-tropical Florida, — Bay Biscayne to the southern keys; in the West Indies.

A tree 12 to 15 metres in height, with a trunk sometimes 0.60 metre in diameter, reaching, in the United States, its greatest development on the shores of Bay Biscayne, near Miami; one of the most common trees of the region, the large specimens generally decayed.

Wood heavy, hard, not strong, close-grained, checking badly in drying, containing many evenly distributed open ducts; medullary rays numerous, thin; color rich dark brown streaked with red, the sap-wood light brown or yellow.

A resinous gum, emetic, purgative, and diuretic, is obtained from incisions made in the bark of this species.

74. *Pistacia Mexicana*, HBK.

Texas, — valley of the Rio Grande near the mouth of the Pecos River ; in northern Mexico.

Wood not examined.

LEGUMINOSÆ.**75. *Eysenhardtia orthocarpa*, Watson.**

Western Texas, valleys of the upper Guadalupe and Rio Grande, west to the Santa Rita and Santa Catalina Mountains, Arizona ; in northern Mexico.

A small tree. 5 to 6 metres in height, with a trunk 0.09 to 0.15 metre in diameter, or more often a low shrub ; dry, gravelly soil, reaching its greatest known development, in the United States, near the summit of the Santa Catalina Mountains, at 3,000 feet elevation.

Wood heavy, hard, close-grained, very compact ; layers of annual growth clearly defined by numerous rows of open ducts ; medullary rays numerous, thin ; color light reddish-brown, the sap-wood clear yellow.

76. *Dalea spinosa*, Gray.

Colorado Desert, southern California to the valley of the lower Gila River, Arizona.

A small tree, sometimes 6 metres in height, with a short, stout trunk 0.45 to 0.50 metre in diameter, or often a low shrub ; dry, gravelly, rocky soil.

Wood light, soft, rather coarse-grained, containing many regularly distributed open ducts ; medullary rays numerous, thin ; color walnut brown, the sap-wood nearly white.

77. *Robinia Pseudacacia*, L.

Locust. Black Locust. Yellow Locust.

Alleghany Mountains, from Pennsylvania to northern Georgia ; widely and generally naturalized throughout the United States east of the Rocky Mountains, and possibly indigenous in northeastern and western Arkansas, and on the prairies of eastern Indian Territory.

A tree 22 to 25 metres in height, with a trunk 0.90 to 1.20 metres in diameter ; west of the Mississippi River much smaller, or often a low shrub 1.80 to 3 metres in height, reaching its greatest development on the western slopes of the mountains of West Virginia.

Wood heavy, exceedingly hard and strong, close-grained, compact, very durable in contact with the ground ; layers of annual growth clearly marked by two or three rows of large open ducts ; color brown or more rarely light green, the sap-wood yellow ; largely used for treenails, posts of all sorts, construction, and in turnery.

The bark of the root is tonic, or in large doses purgative and emetic. The locust was formerly widely planted as a timber tree; its cultivation in the United States is now generally abandoned on account of the destructive attacks of the locust-borer (*Cyllene picta*).

78. *Robinia viscosa*, Vent.

Clammy Locust.

High Alleghany Mountains of North Carolina.

A small tree, 9 to 12 metres in height, with a trunk not exceeding 0.30 metre in diameter; very rare and local in a wild state, but now widely cultivated and occasionally naturalized in the Atlantic States.

Wood (of a cultivated specimen) heavy, hard, close-grained, compact; layers of annual growth clearly marked by many rows of open ducts; medullary rays numerous, thin; color brown, the sap-wood light yellow.

79. *Robinia Neo-Mexicana*, Gray.

Locust.

Southern Colorado, through western and southwestern New Mexico to the Santa Catalina and Santa Rita Mountains, Arizona, and in southern Utah.

A small tree, sometimes 6 to 8 metres in height, with a trunk 0.15 to 0.25 metre in diameter, or toward its upper limits of growth reduced to a low shrub; reaching its greatest development in the valley of the Purgatory River, Colorado.

Wood heavy, exceedingly hard, strong, close-grained, compact, satiny, containing many evenly distributed open ducts; medullary rays thin, conspicuous; color yellow streaked with brown, the sap-wood light yellow.

80. *Olneya Tesota*, Gray.

Iron-wood. Arbol de Hierro.

California, valley of the Colorado River south of the Mohave Mountains, valley of the lower Gila River, southwestern Arizona; southward in Sonora.

A small tree, in the United States rarely 9 metres in height, with a trunk sometimes 0.45 metre in diameter; dry *arroyos* and cañons; in Sonora more common and of larger size.

Wood very heavy and hard, strong, brittle, close-grained, compact; the grain generally contorted, difficult to cut and work, susceptible of a high polish; medullary rays numerous, thin; color rich dark brown streaked with red, the sap-wood clear bright yellow; occasionally manufactured into canes and other small objects.

81. *Piscidia Erythrina*, L.

Jamaica Dogwood.

Semi-tropical Florida, — Bay Biscayne and Pease Creek to the southern keys ; in the West Indies and southern Mexico.

A tree 12 to 15 metres in height, with a trunk 0.45 to 0.75 metre in diameter.

Wood heavy, very hard, not strong, close-grained, compact, susceptible of a high polish, containing few large scattered open ducts ; medullary rays thin, not conspicuous ; color yellowish brown, the sap-wood lighter ; one of the most valuable woods of the region for boat-building, firewood, and charcoal.

The bark, especially of the root, narcotic, occasionally administered in the form of tinctures, or used, as well as the young branches and leaves, to poison or stupefy fish.

82. *Cladrastis tinctoria*, Raf.

Yellow-wood. Yellow Ash. Gopher-wood.

Central Kentucky, and middle Tennessee to the mountains of East Tennessee and Cherokee County, North Carolina.

A tree 9 to 15 metres in height, with a trunk sometimes 0.90 metre, or exceptionally 1.20 metres, in diameter ; rich hillsides ; reaching its greatest development in middle Tennessee ; rare and very local, the large trees generally hollow or defective.

Wood heavy, very hard, strong, close-grained, compact, susceptible of a good polish ; layers of annual growth clearly marked by several rows of open ducts, and containing many evenly distributed similar ducts ; color bright clear yellow, changing with exposure to light brown, the sap-wood nearly white ; used for fuel, occasionally for gunstocks, and yielding a clear yellow dye.

83. *Sophora secundiflora*, Lagasca.

Frigolito.

Matagorda Bay, Texas, west to the mountains of New Mexico.

A small tree, sometimes 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often, especially west of the San Antonio River, a tall shrub rarely exceeding 2 metres in height, and forming dense thickets ; borders of streams, generally in low, rather moist soil.

Wood very heavy, hard, close-grained, compact, susceptible of a high polish ; medullary rays numerous, thin ; color orange streaked with red, the heavier sap-wood brown or yellow ; furnishing valuable fuel.

The seeds contain an exceedingly poisonous alkaloid, *Sophoria*.

84. *Sophora affinis*, Torr. & Gray.

Valley of the Arkansas River, Arkansas to the valley of the San Antonio River, Texas.

A small tree, 5 to 7 metres in height, with a trunk sometimes 0.15 to 0.25 metre in diameter; borders of streams and prairies.

Wood heavy, very hard, strong, coarse-grained, compact; layers of annual growth clearly marked with several rows of large open ducts; medullary rays thin, conspicuous; color light red, the sap-wood bright clear yellow.

85. *Gymnocladus Canadensis*, Lam.

Kentucky Coffee-tree. Coffee-nut.

Southern Pennsylvania (rare); western New York (rare); west through southern Ontario and southern Michigan to the valley of the Minnesota River, Minnesota, eastern Nebraska, eastern Kansas, southwestern Arkansas, and the Indian Territory, extending south to middle Tennessee.

A tree 25 to 33 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich woods and bottom-lands; not common.

Wood heavy, not hard, strong, coarse-grained, durable in contact with the ground, liable to check in drying, easily worked, susceptible of a high polish; layers of annual growth clearly marked by one or two rows of open ducts; medullary rays numerous, thin; color light rich brown tinged with red, the thin sap-wood lighter; occasionally used in cabinet-making, for posts, rails, etc.

The fresh leaves, macerated and sweetened, are occasionally used as a poison for house-flies; the seeds, formerly as a domestic substitute for coffee.

86. *Gleditschia triacanthos*, L.

Honey Locust. Black Locust. Three-thorned Acacia. Sweet Locust. Honey Shucks.

Western slopes of the Alleghany Mountains of Pennsylvania, west through southern Michigan to eastern Nebraska, eastern Kansas, and the Indian Territory; south to Tampa Bay, Florida (not detected in east Florida), northern Alabama, northern Mississippi, and the valley of the Brazos River, Texas.

A tree 25 or 30 metres, or exceptionally 40 metres, in height, with a trunk 0.60 to 1.20 metres in diameter; low, rich bottom-lands, or more rarely on dry, sterile hills; the characteristic tree of the "barrens" of middle Kentucky and Tennessee; reaching its greatest development on the bottom-lands of the lower Ohio River basin; widely cultivated for shade and as a hedge plant, and now somewhat naturalized in the Atlantic States east of the Alleghany Mountains. A not uncommon form, nearly destitute of thorns, is var. *inermis*, Pursh.

Wood heavy, hard, strong, coarse-grained, moderately compact, very durable in contact with the soil, susceptible of a high polish; layers of annual growth strongly marked by many rows of open ducts; medullary rays numerous, conspicuous; color bright brown or red, the sap-wood lighter; used for fence posts and rails, wagon hubs, construction, etc.

87. *Gleditschia monosperma*, Walt.*Water Locust.*

South Carolina, generally near the coast, to Matanzas Inlet and Tampa Bay, Florida, through the Gulf States to the valley of the Brazos River, Texas, and through Arkansas to middle Kentucky and Tennessee, southern Indiana and Illinois.

A tree 12 to 18 metres in height, with a trunk sometimes 0.60 or, exceptionally, 0.90 metre in diameter; deep swamps; rare in the south Atlantic and Gulf States; common and reaching its greatest development on the bottom-lands of southern Arkansas, Louisiana, and eastern Texas, here often covering extensive areas.

Wood heavy, very hard, strong, rather coarse-grained, compact, susceptible of a high polish; layers of annual growth clearly marked by one to three rows of open ducts; medullary rays thin, conspicuous; color rich bright brown tinged with red, the thick heavier sap-wood clear light yellow.

88. *Parkinsonia Torreyana*, Watson.*Green-barked Acacia. Palo Verde.*

Colorado Desert, southern California to the valley of the lower Gila River, Arizona.

A low, much-branched tree, 8 to 10 metres in height, the short trunk sometimes 0.45 to 0.50 metre in diameter; low cañons and depressions in the sand-hills of the desert; common and reaching its greatest development in the valleys of the lower Colorado and Gila Rivers.

Wood heavy, not strong, soft, close-grained, compact, satiny, susceptible of a beautiful polish, containing many small, evenly distributed, open ducts; medullary rays very numerous, thin; color light brown, the sap-wood clear light yellow.

89. *Parkinsonia microphylla*, Torr.

Valleys of the lower Colorado and Bill Williams Rivers, eastward through southern Arizona.

A small, much-branched tree, 6 to 7 metres in height, with a trunk 0.25 to 0.30 metre in diameter; or often a low shrub, 1 to 3 metres in height.

Wood heavy, hard, coarse-grained, compact, containing numerous large scattered open ducts; medullary rays numerous, thin, conspicuous; color dark rich brown streaked with red, the sap-wood light brown or yellow.

90. *Parkinsonia aculeata*, L.

Corpus Christi, Texas, west along the Mexican boundary to the valley of the Colorado River, Arizona, and southward into Mexico; probably of American origin, but now widely naturalized throughout the tropical and warmer regions of the globe.

A small tree, 6 to 12 metres in height, with a trunk sometimes 0.30 metre in diameter.

Wood heavy, hard, very close-grained, inclined to check in drying, containing many evenly distributed small open ducts; medullary rays very numerous, thin, conspicuous; color light brown, the very thick sap-wood lighter, often tinged with yellow.

91. *Cercis Canadensis*, L.

Red-bud. Judas Tree.

Western Pennsylvania, south to Tampa Bay, Florida, and northern Alabama and Mississippi, west through southern Michigan and Minnesota to eastern Nebraska; southwest through Missouri and Arkansas to the eastern portions of the Indian Territory, Louisiana, and the valley of the Brazos River, Texas.

A small tree, 12 to 16 metres in height, with a trunk sometimes 0.30 metre in diameter; rich woods, borders of streams, and swamps; most common and reaching its greatest development in southern Arkansas, the Indian Territory, and eastern Texas.

Wood heavy, hard, not strong, rather coarse-grained, compact, susceptible of a good polish; layers of annual growth clearly marked by one to three rows of open ducts; medullary rays exceedingly numerous, thin; color rich dark brown tinged with red, the sap-wood lighter.

92. *Cercis reniformis*, Engelm.

Red-bud.

Middle and western Texas west of the Colorado River; in northern Mexico.

A small tree, 6 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a shrub forming dense thickets; limestone hills.

Wood heavy, hard, close-grained, compact; layers of annual growth clearly marked by one to three rows of open ducts; medullary rays numerous, not conspicuous; color brown streaked with yellow, the sap-wood lighter.

93. *Prosopis juliflora*, DC.

Mesquit. Algaroba. Honey Locust. Honey Pod.

Texas, — valley of the Trinity River to the northern and western limits of the State; west through New Mexico and Arizona to the western foothills of the San Bernardino Mountains, California, reaching southern Colorado, southern Utah, and southern Nevada; in northern Mexico.

A tree of the first economic value, sometimes 9 to 15 metres in height, with a trunk 0.90 metre in diameter, or much smaller, often reduced to a low shrub; dry prairies and high rocky plains, or west of the Rocky Mountains, along desert streams, here often forming open forests, and

reaching its greatest development, within the United States, in the valley of the Santa Cruz and other streams of southern Arizona; in western Texas, owing to the annual burning of the prairies, rarely 1 metre in height, the roots then enormously developed, often weighing several hundred pounds, and forming, as they are here locally known, "under-ground forests," furnishing the best and cheapest fuel of the region.

Wood heavy, very hard, not strong, close-grained, compact, difficult to work, almost indestructible in contact with the soil, containing many evenly distributed, rather large, open ducts; medullary rays numerous, distinct; color rich dark brown or often red, the sap-wood clear yellow; exclusively used for the beams and underpinnings of the adobe houses of New Mexico, Arizona, and northern Mexico, for posts and fencing, and occasionally in the manufacture of furniture, the felloes of heavy wheels, etc.; the best and often the only fuel of the region, burning slowly with a clear flame, and producing valuable charcoal, but unsuited for the generation of steam on account of its destructive action upon boilers.

A gum resembling gum-arabic is yielded by this species; the unripe and pulpy pods rich in grape sugar, are edible, furnishing valuable and important fodder.

94. *Prosopis pubescens*, Benth.

Screw Bean. Screw-pod Mesquit. Tornilla.

Valley of the Rio Grande in western Texas, west through New Mexico and Arizona to southern California, southern Utah and southern Nevada; in northern Mexico.

A small tree, rarely 9 metres in height, with a trunk sometimes 0.30 to 0.45 metre in diameter, or often a tall, much-branched shrub; sandy or gravelly river-bottoms, reaching its greatest development, within the United States, in the valleys of the lower Colorado and Gila Rivers.

Wood heavy, exceedingly hard, not strong, brittle, close-grained, compact, containing many evenly distributed open ducts; medullary rays numerous, thin; color light brown, the sap-wood somewhat lighter; used for fuel and fencing.

The pods used as fodder are sometimes made into flour by the Indians.

95. *Leucaena glauca*, Benth.

Western Texas, — San Saba to Devil's River; in northern Mexico; semi-tropical Florida (introduced); and through the West Indies.

A small tree, 7 to 9 metres in height, with a trunk 0.10 to 0.15 metre in diameter; or often a tall or, in Florida, low shrub, sending up many stems from the ground.

Wood heavy, hard, close-grained, compact, containing many small regularly distributed open ducts; layers of annual growth and medullary rays hardly distinguishable; color rich brown streaked with red, the sap-wood clear yellow.

96. *Leucaena pulverulenta*, Benth.

Southern Texas, — valley of the lower Rio Grande; in northern Mexico.

A small tree, 6 to 8 metres in height, with a trunk 0.10 to 0.15 metre in diameter, often forming dense thickets; rich, sandy loam.

Wood heavy, hard, very close-grained, compact, containing many small, regularly distributed, open ducts; medullary rays very numerous, thin, conspicuous; color rich dark brown, the sap-wood clear yellow.

97. *Acacia Wrightii*, Benth.*Cat's Claw.*

Valley of the Guadalupe River, western Texas, west and south to the valley of the Rio Grande; in northern Mexico.

A small tree, rarely 9 metres in height, with a trunk sometimes exceeding 0.30 metre in diameter, or often a low, much-branched shrub.

Wood very heavy, hard, very close-grained, compact; layers of annual growth marked by one or two rows of small open ducts, and containing many scattered smaller ducts; medullary rays hardly distinguishable; color bright clear brown streaked with red and yellow, the sap-wood clear yellow.

98. *Acacia Greggii*, Gray.*Cat's Claw.*

Valley of the Rio Grande in western Texas, west through southern New Mexico and Arizona to San Diego, California; in northern Mexico.

A low, much-branched tree, sometimes 9 metres in height, with a trunk rarely 0.45 metre in diameter, or often a shrub; dry slopes and low cañons; common, the large specimens generally hollow and defective.

Wood heavy, exceedingly hard, strong, brittle, close-grained, compact; layers of annual growth marked by numerous rows of rather large open ducts; medullary rays numerous, thin; color rich brown or red, the sap-wood light yellow.

A resinous gum resembling gum-arabic is yielded by this species.

99. *Acacia Berlandieri*, Benth.

Valley of the Nueces to Devil's River, southern Texas, southward into Mexico.

A small tree, sometimes 6 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter; or more often a tall shrub, sending up many stems from the ground.

Wood not examined.

100. *Lysiloma latisiliqua*, Benth.*Wild Tamarind.*

Southern keys of semi-tropical Florida; in the West Indies.

A tree sometimes 15 metres in height, with a trunk 0.60 to 0.90 metre in diameter.

Wood heavy, hard, not strong, tough, close-grained, compact, susceptible of a fine polish, containing many scattered open ducts; medullary rays numerous, not conspicuous; color rich dark brown tinged with red, the sap-wood white; somewhat used, locally, in boat and ship building.

101. *Pithecolobium Unguis-cati*, Benth.*Cat's Claw.*

Semi-tropical Florida, — Caximbas Bay to the southern keys; in the West Indies.

A small tree, sometimes 6 metres in height, with a trunk rarely exceeding 0.15 metre in diameter, or often throwing out many spreading, vine-like stems from the ground.

Wood very heavy, hard, close-grained, checking badly in drying; medullary rays numerous, inconspicuous; color rich red varying to purple, the sap-wood clear yellow.

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102. *Chrysobalanus Icaco*, L.*Cocoa Plum.*

Semi-tropical Florida, — Cape Canaveral and Caximbas Bay to the southern keys; through the West Indies and tropical America to Brazil.

A small tree, 7 to 10 metres in height, with a trunk 0.15 to 0.30 metre in diameter; or along sandy beaches a low prostrate shrub 1.08 to 2.16 metres in height; reaching its greatest development, within the United States, on the borders and islands of the Everglades, near Bay Biscayne.

Wood heavy, hard, strong, close-grained, compact, containing few irregularly distributed, not large, open ducts; medullary rays numerous, thin; color light brown often tinged with red, the sap-wood lighter.

103. *Prunus Americana*, Marsh.*Wild Plum. Canada Plum. Horse Plum.*

Valley of the Saint Lawrence to the valleys of Rainy and Assinaboine Rivers and the southern shores of Lake Manitoba; northern Vermont, western New England, and southward through the Atlantic States to western Florida; west to the valley of the upper Missouri River, Dakota, Pike's Peak region, Colorado, and the valley of the lower Concho River, Texas.

A small tree, 6 to 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; rich woods, or along streams and the borders of ponds and swamps, reaching its greatest development on the bottom-lands of eastern Texas.

Wood heavy, very hard, strong, very close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, thin; color rich bright brown or often red, the sap-wood lighter; used for the handles of tools, etc.

Often cultivated for the yellow, red, or rarely nearly black acid, or rarely sweet fruit.

104. *Prunus angustifolia*, Marsh.

Chickasaw Plum. Hog Plum.

Probably native of the eastern slopes of the southern Rocky Mountains, where it is found at an altitude of 7,000 feet, and of the high plateau east and southeast of them; now widely naturalized by early cultivation throughout the Atlantic forests south of Pennsylvania and west of the Alleghany Mountains, extending as far north as southern Michigan.

A small tree, 6 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or often a low shrub, generally along streams or borders of prairies, in rich soil.

Wood heavy, soft, not strong, close-grained, compact; medullary rays numerous, thin; color light brown or red, the sap-wood lighter. Often cultivated for its globose red or yellow fruit.

105. *Prunus Pennsylvanica*, L. f.

Wild Red Cherry. Pin Cherry. Pigeon Cherry.

Labrador, shores of Hudson's Bay, and west through the Saskatchewan region to the valley of the upper Fraser River; south through the northern States to Pennsylvania, central Michigan, northern Illinois, central Iowa, and along the high Alleghany Mountains of North Carolina and Tennessee, and the Rocky Mountains of Colorado.

A small tree, rarely exceeding 12 metres in height, with a trunk sometimes 0.60 metre in diameter, or in the Rocky Mountain region reduced to a low shrub; common in all the northern forests, and taking possession of ground cleared by fire of forest growth.

Wood light, soft, close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood clear yellow.

The small acid fruit used domestically and by herbalists in the preparation of cough mixtures, etc.

106. *Prunus umbellata*, Ell.

Sloe. Black Sloe.

South Carolina, south near the coast to Mosquito Inlet and Tampa Bay, Florida, and through central Alabama to eastern Mississippi.

A small tree, 5 to 6 metres in height, with a trunk 0.25 to 0.38 metre in diameter; dry, sandy soil.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin; color dark reddish brown, the sap-wood much lighter.

107. *Prunus emarginata*, Walp.

Vancouver's Island and the valley of the lower Fraser River, south through western Washington and Oregon, and along the western slopes of the Sierra Nevada and in the Coast Ranges, from San Francisco Bay to the Santa Lucia Mountains, California; east to the western slopes of the Bitter Root Mountains, Idaho, and the valley of the Jocko River, Montana.

A tree often 12 to 15 metres in height, with a trunk sometimes exceeding 0.30 metre in diameter; at high elevations and throughout central California reduced to a shrub 2 to 3 metres in height, or, in the Santa Lucia Mountains, 15 to 18 metres in height, with a trunk 0.60 to 0.90 metre in diameter; generally along streams or in low, rich woods. The common northern and Idaho form, more or less woolly pubescent, especially on the under side of the leaves, is var. *mollis*, Brewer.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, thin; color brown streaked with green.

108. *Prunus serotina*, Ehrh.

Wild Black Cherry. Rum Cherry.

Southern Ontario, southward through the Atlantic forests to Matanzas Inlet and Tampa Bay, Florida; west to the valley of the Missouri River, Dakota, eastern Kansas, the Indian Territory, and the valley of the upper San Antonio River, Texas.

A tree 18 to 30 metres in height, with a trunk 0.90 to 1.20 metres, or exceptionally 1.50 metres, in diameter; rich, generally upland woods; common and reaching its greatest development on the western slopes of the Alleghany Mountains from West Virginia southward; not common and of small size in the Gulf region and Texas.

Wood light, hard, strong, close, straight-grained, compact, easily worked; medullary rays numerous, thin; color light brown or red, growing darker with exposure, the thin sap-wood yellow; largely used and esteemed in cabinet work, interior finish, etc., and now becoming scarce.

The bark contains a bitter tonic principle, and infused with cold water generates a small percentage of hydrocyanic acid, and is employed as a tonic and sedative in cases of pulmonary consumption in the form of cold infusions, syrups, and fluid extracts; the bitter fruit used domestically in the preparation of cherry brandy.

109. *Prunus Capuli*, Cav.*Wild Cherry.*

Apache and Guadalupe Mountains, Texas, west through southern New Mexico and Arizona to the southern slopes of the San Francisco Mountains; in northern New Mexico, and Peru.

A small tree, in the United States rarely 12 metres in height, with a trunk often 0.30 metre in diameter; bottoms of cañons and mountain valleys, generally between 5,000 and 7,000 feet elevation.

Wood heavy, moderately hard, close-grained, compact; medullary rays very numerous, thin; color brown, or often bright clear red, the sap-wood nearly white.

110. *Prunus demissa*, Walp.*Wild Cherry.*

Vancouver's Island, east to the western slopes of the Rocky Mountains of Montana, south through the Pacific region; and in Sonora.

A small tree, sometimes 7 to 10 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or more often a low shrub; reaching its greatest development in the rich valleys of southern Oregon and northern California, near the coast; in southern California, and east of the Cascade and Sierra Nevada Ranges, a low shrub confined to high mountain valleys.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, conspicuous; color light brown, the sap-wood lighter.

111. *Prunus Caroliniana*, Ait.*Wild Orange. Mock Orange. Wild Peach.*

North Carolina, south, near the coast, to Bay Biscayne, Florida, southern Alabama, and west, along the Gulf coast, to the valley of the Guadalupe River, Texas.

A small evergreen tree, 10 to 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; common and reaching its greatest development in the rich, light, deep soil of the bottom-lands of eastern Texas.

Wood heavy, hard, strong, close-grained, checking badly in drying, susceptible of a good polish; medullary rays numerous, thin; color light reddish-brown, or, more rarely, dark rich brown, the sap-wood lighter.

112. *Prunus sphærocarpa*, Sw.

Western shores of Bay Biscayne, Florida; in the West Indies.

A small tree, in Florida not exceeding 6 metres in height, with a trunk 0.10 to 0.15 metre in diameter; high rocky woods, or more rarely along the borders of streams and ponds; rare and local in the United States.

Wood heavy, hard, close-grained, checking badly in drying, containing many very small open ducts; layers of annual growth and medullary rays obscure; color light clear red, the sap-wood pale yellow.

113. *Prunus ilicifolia*, Walp.*Islay.*

California, — Coast Ranges from San Francisco Bay south to the southern boundary of the State, extending to the western slopes of the San Bernardino and San Jacinto Mountains.

A small evergreen tree, often 9 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter, or in the interior often reduced to a low shrub.

Wood very heavy, hard, strong, close-grained, checking in seasoning, satiny, susceptible of a beautiful polish, containing many regularly distributed, rather small, open ducts; medullary rays numerous, thin; color bright reddish brown, the sap-wood much lighter; furnishing valuable fuel.

114. *Vauquelinia Torreyi*, Watson.

Arizona, — high mountains of the Gila Valley, summits of the Santa Catalina Mountains; in Sonora.

A small tree in the Santa Catalina Mountains, 4 to 6 metres in height, with a trunk 0.10 to 0.20 metre in diameter; dry slopes and rocky bluffs between 2,700 and 4,000 feet elevation, in granitic soil; generally hollow and decayed.

Wood very heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, thin; color rich dark brown streaked with red, the sap-wood yellow.

115. *Cercocarpus ledifolius*, Nutt.*Mountain Mahogany.*

Cœur d'Alene Mountains, Idaho, southward along the western slopes of the Rocky Mountains of Montana and Wyoming; eastern extremities of the Blue Mountains of Washington and Oregon; Wahsatch Mountains, Utah, and west along the mountain ranges of the Great Basin to the western slope of the Sierra Nevada of California, extending southward into Arizona and New Mexico.

A small, low tree, rarely 12 metres in height, with a trunk sometimes 0.60 to 0.90 metre in diameter, or north of Utah and Nevada reduced to a low shrub; dry rocky mountain slopes, between 6,000 and 8,000 feet elevation, reaching its greatest development on the high ranges of central Nevada.

Wood very heavy, hard, close-grained, compact, brittle, difficult to work, susceptible of a beautiful polish; medullary rays very numerous, thin; color bright clear red, or often dark rich brown, the sap-wood clear yellow; furnishing the most valuable fuel of the region, and largely manufactured into charcoal.

116. *Cercocarpus parvifolius*, Nutt.*Mountain Mahogany.*

California, — valley of the Klamath River, southward through the Coast Ranges to the San Bernardino and San Jacinto Mountains; Lower California; Rocky Mountains of Wyoming, Colorado, and New Mexico, mountains of southern Arizona, and southward into Mexico.

A small tree, rarely 6 to 9 metres in height, with a trunk sometimes 0.30 metre in diameter, or more often a shrub; dry, gravelly soil, reaching its greatest development on the mountains of southern New Mexico and Arizona at an elevation of 6,000 to 8,000 feet.

Wood very heavy, hard, close-grained, compact, difficult to work, susceptible of a beautiful polish; medullary rays numerous, thin; color bright reddish brown, the sap-wood light brown; furnishing valuable fuel.

117. *Pyrus coronaria*, L.*American Crab. Sweet-scented Crab.*

Valley of the Humber River, and shores of Lake Erie, Ontario, southward through western New York and Pennsylvania to the District of Columbia, and along the Alleghany Mountains to central Alabama and northern Mississippi; west to southern Minnesota, Iowa, eastern Kansas, the Indian Territory, and northern Louisiana.

A small tree, rarely 6 to 9 metres in height, with a trunk often 0.30 metre in diameter; rich, rather low woods, reaching its greatest development in the valleys of the lower Ohio region.

Wood heavy, rather soft, not strong, very close-grained, checking badly in drying; medullary rays numerous, obscure; color brown varying to light red, the sap-wood yellow; used for levers, handles of tools, and in turnery.

118. *Pyrus angustifolia*, Ait.*American Crab Apple. Southern Crab Apple.*

Pennsylvania(?), southern Delaware, and the valley of the lower Wabash River, Illinois, south to western Florida.

A small tree, 6 to 9 metres in height, with a trunk rarely 0.30 metre in diameter; low, rich woods; common and reaching its greatest development on the bottom-lands of the South Atlantic States; less common west of the Alleghany Mountains.

Wood heavy, hard, close-grained, checking badly in drying; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood yellow; used for levers, handles of tools, etc.

119. *Pyrus rivularis*, Dougl.*Oregon Crab Apple.*

Coast of Alaska, southward along the coast and islands of British Columbia, through Washington and Oregon, west of the Cascade Mountains, to northern California.

A small tree, sometimes 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter; low, rich woods, generally along streams, often forming dense thickets.

Wood heavy, hard, very close-grained, liable to check badly in drying, susceptible of a beautiful polish; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood lighter; used for mallets, mauls, bearings of machinery, etc.

120. *Pyrus Americana*, DC.*Mountain-ash.*

Labrador, Newfoundland, Anticosti Island, and westward along the southern shore of James Bay to the valley of the Nelson River, southward through all the elevated regions of the northeastern States, and along the high mountains of Virginia and North Carolina; in northern Michigan, northern Wisconsin, and northern Minnesota.

A small tree, 6 to 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter; borders of swamps and moist, rocky woods, reaching its greatest development on the northern shores of Lakes Huron and Superior.

Wood light, soft, close-grained, compact; medullary rays numerous, obscure; color light brown, the sap-wood lighter.

121. *Pyrus sambucifolia*, Cham. & Schlecht.*Mountain-ash.*

Labrador to northern New England and the shores of Lake Superior; high mountain ranges of the Pacific region from Alaska to southern New Mexico; in Kamschatka.

A small tree, 9 to 12 metres in height, with a trunk sometimes 0.30 metre in diameter, or in the Pacific forests generally reduced to a low shrub; cold, wet swamps or borders of streams, reaching its greatest development in northern New England and Minnesota.

Wood light, soft, weak, close-grained, compact; medullary rays numerous, obscure; color light brown, the sap-wood nearly white.

The astringent bark and unripe fruit of the American mountain ashes, like those of the nearly allied *P. aucuparia* of Europe, are extremely astringent, and occasionally used, domestically, in infusions, decoctions, etc., in the treatment of diarrhœa.

122. *Cratægus rivularis*, Nutt.

British Columbia, south through eastern Oregon and Washington, east and southeast along the mountain ranges of Idaho, Montana, Utah, and Colorado to the Pinos Altos Mountains, New Mexico.

A small tree, 6 to 8 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; or often a tall, much-branched shrub, forming dense, impenetrable thickets along borders of streams and swamps.

Wood heavy, hard, close-grained, compact; medullary rays numerous, thin; color bright reddish brown, the sap-wood nearly white.

123. *Cratægus Douglasii*, Lindl.

British Columbia, south through Washington and Oregon to northern California, extending east through Idaho and Montana to the western base of the Rocky Mountains.

A small tree, sometimes 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or often a tall shrub throwing up many stems from the ground and forming impenetrable thickets; rather wet, sandy soil along streams, and reaching its greatest development in the valleys west of the Cascade Mountains; toward its eastern limits a low shrub.

Wood heavy, hard, tough, close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, thin; color nearly white tinged with rose, the sap-wood lighter; used for wedges, mauls, etc.

124. *Cratægus brachyacantha*, Sargent & Engelm.

Hog's Haw.

Western Louisiana and eastern Texas.

A tree 9 to 12 metres in height, with a trunk sometimes 0.60 metre in diameter; borders of streams in low, very rich soil; the largest North American representative of the genus; rare and local.

Wood heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, very obscure; color light brown tinged with rose, the sap-wood lighter.

The large fruit blue-black.

125. *Cratægus arborescens*, Ell.

Valley of the Savannah River, South Carolina, south to western Florida; and from the neighborhood of Saint Louis, Missouri, south and southwest to western Louisiana, and the valley of the lower Colorado River, Texas.

A small tree, 6 to 9 metres in height, with a trunk sometimes 0.45 to 0.60 metre in diameter; borders of streams and low, wet swamps.

Wood heavy, hard, not strong, close-grained, compact; susceptible of a beautiful polish; medullary rays very numerous, obscure; color light brown tinged with red, the sap-wood lighter.

The small globular fruit bright red, or, more rarely, orange.

126. *Cratægus Crus-galli*, L.*Cockspur Thorn. Newcastle Thorn.*

Valley of the Saint Lawrence River, west through southern Ontario to Manitoba, south, through the Atlantic forests, to western Florida, and the valley of the Colorado River, Texas.

A small tree, 4 to 10 metres in height, with a trunk sometimes 0.30 metre in diameter; varying greatly in the size of the fruit, size and shape of the leaves, etc.

Wood heavy, hard, not strong, close-grained, compact, satiny, susceptible of a fine polish; medullary rays numerous, very obscure; color brown tinged with red, the sap-wood rather lighter.

127. *Cratægus coccinea*, L.*Scarlet Haw. Red Haw. White Thorn.*

West coast of Newfoundland, west along the valley of the Saint Lawrence River and the northern shores of the great lakes to Manitoba, south through the Atlantic forests to northern Florida and eastern Texas.

A small tree, sometimes 9 metres in height, with a trunk 0.30 metre in diameter; open upland woods or borders of streams and prairies; very common at the North, rare at the South; running into many forms, varying in the size and shape of the leaves, size of the fruit, etc.

Wood heavy, hard, close-grained, compact; medullary rays thin, very obscure; color brown tinged with red, the sap-wood a little lighter.

128. *Cratægus subvillosa*, Schrad.*Scarlet Haw.*

Eastern Massachusetts (possibly introduced); central Michigan to eastern Nebraska, south to middle Tennessee, and southwest through Missouri, Arkansas, the Indian Territory, and Texas to the valley of the San Antonio River.

A small tree, 7 to 9 metres in height, with a trunk rarely 0.45 metre in diameter; rich woods and borders of streams and prairies.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, very obscure; color light brown or light red, the sap-wood lighter.

The large red fruit often downy, edible, of agreeable flavor.

129. *Cratægus tomentosa*, L.*Black Thorn. Pear Haw.*

New Brunswick, west along the valley of the Saint Lawrence River and the northern shores of the great lakes to the Saskatchewan region, southward through the Atlantic forests to western Florida and eastern Texas, extending west to the mountains of eastern Washington and Oregon, southwestern Colorado, and southwestern New Mexico.

A small tree, 6 to 9 metres in height, with a trunk rarely 0.45 metre in diameter, or often, especially west of the Rocky Mountains, reduced to a low shrub, here forming dense thickets along mountain streams; the most widely distributed representative of the genus in North America, and varying greatly in the size, shape, and color of the fruit, form of the leaves, amount of pubescence, etc.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, thin; color bright reddish brown, the sap-wood lighter.

130. *Cratægus cordata*, Ait.

Washington Thorn.

Virginia, southward along the Alleghany Mountains to northern Georgia and Alabama, extending west through middle and eastern Kentucky and Tennessee to southern Illinois.

A small tree, 6 to 8 metres in height, with a trunk rarely 0.30 metre in diameter, generally along banks of streams.

Wood heavy, hard, close-grained, compact; medullary rays numerous, obscure; color brown tinged with red, the sap-wood lighter.

131. *Cratægus apiifolia*, Michx.

Parsley Haw.

Southern Virginia, southward near the coast to about latitude 28°, extending west through the Gulf States to southern Arkansas and the valley of the Trinity River, Texas.

A small tree, rarely 6 to 9 metres in height, with a slender stem rarely exceeding 0.08 to 0.10 metre in diameter, or more often a low, much-branched shrub; low, rich soil, reaching its greatest development on the pine-barren hummocks of central Florida.

Wood heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays thin, very obscure; color bright brown tinged with red or rose, the sap-wood much lighter.

132. *Cratægus spathulata*, Michx.

Small-fruited Haw.

Virginia, southward to western Florida, west through the Gulf States to the valley of the Washita River, Arkansas, and the Colorado River, Texas.

A small tree, 6 to 8 metres in height, with a trunk 0.20 to 0.25 metre in diameter, or often reduced to a low shrub; margins of streams and prairies, common, and reaching its greatest development on the bottomlands of western Louisiana and eastern Texas.

Wood heavy, hard, not strong, close-grained, compact; medullary rays very numerous, obscure; color light brown or red, the sap-wood lighter.

133. *Cratægus berberifolia*, Torr. & Gray.

Western Louisiana.

A small tree, 6 to 8 metres in height, with a trunk 0.20 to 0.25 metre in diameter; borders of prairies, in low ground; rare, local, and still very imperfectly known; the fruit and wood not yet collected.

134. *Cratægus æstivalis*, Torr. & Gray.

May Haw. Apple Haw.

South Carolina to northern Florida, and west through the Gulf States to southern Arkansas and the valley of the Sabine River, Texas.

A small tree, 6 to 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter; generally in sandy soil along the margins of streams and ponds; common and reaching its greatest development on the bottom-lands of western Louisiana and eastern Texas.

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, obscure; color light brown or red, the sap-wood lighter.

The large, globular, fragrant red fruit possesses an agreeable subacid flavor, and ripens in May.

135. *Cratægus flava*, Ait.

Summer Haw. Yellow Haw. Red Haw.

Virginia southward, generally near the coast, to Tampa Bay, Florida, extending west through the Gulf States to eastern Texas and southern Arkansas.

A small tree, rarely 7 metres in height, with a trunk 0.30 metre in diameter, or reduced to a much-branched shrub 2 to 3 metres in height; borders of streams, in low, sandy soil subject to overflow. A variety distinguished by the pubescence upon the calyx and young branches, smaller flowers, and larger globular or pear-shaped edible fruit, is var. *pubescens*, Gray.

Wood heavy, hard, close-grained, checking badly in drying, satiny, susceptible of a good polish; medullary rays very numerous, obscure; color light brown tinged with red or rose, the sap-wood lighter.

Fruit small, red or yellow, acid, or in the variety large and edible.

136. *Heteromeles arbutifolia*, Rœm.

Toyon. Tollon. California Holly.

California, — Coast Ranges, Mendocino to San Diego County, extending east to the foot-hills of the Sierra Nevada and San Bernardino Mountains.

A small, low-branched evergreen tree, rarely exceeding 9 metres in height, the short trunk sometimes 0.30 to 0.45 metre in diameter; or more often a low, much-branched shrub.

Wood very heavy, hard, close-grained, inclined to check in drying, satiny, susceptible of a beautiful polish; medullary rays numerous, very obscure; color dark reddish-brown, the sap-wood lighter.

137. *Amelanchier Canadensis*, Torr. & Gray.

June-berry. Shad-bush. Service Tree. May Cherry.

Newfoundland and Labrador, west along the southern shores of Hudson's Bay to the Saskatchewan region; south through the Atlantic forests to northern Florida, southwestern Arkansas, and the Indian Territory.

A small tree, 9 to 15 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or in some forms reduced to a low shrub (vars. *rotundifolia* and *oligocarpa*, Torr. & Gray); common at the north, rare at the south, and reaching its greatest development on the high slopes of the southern Alleghany Mountains; varying greatly in the shape of the leaves, size of the flowers, amount of pubescence on the leaves and young shoots, etc. (var. *oblongifolia*, Torr. & Gray).

Wood heavy, hard, strong, close-grained, satiny, susceptible of a good polish; medullary rays very numerous, obscure; color dark brown often tinged with red, the sap-wood much lighter.

HAMAMELACEÆ.

138. *Hamamelis Virginica*, L.

Witch-hazel.

Northern New England and southern Ontario to Wisconsin, south to northern Florida and eastern Texas.

A small tree, exceptionally 7 to 9 metres in height, with a trunk 0.30 to 0.37 metre in diameter, or more often a tall shrub throwing up many stems from the ground; common; rich, rather damp woodlands, reaching its greatest development upon the southern Alleghany Mountains.

Wood heavy, hard, very close-grained, compact; layers of annual growth hardly distinguishable; medullary rays numerous, thin, obscure; color light brown tinged with red, the sap-wood nearly white.

The bark and leaves rich in tannin, and largely used by herbalists in the form of fluid extracts, decoctions, etc., in external applications (Pond's Extract), and as a reputed remedy in hemorrhoidal affections.

139. *Liquidambar Styraciflua*, L.

Sweet Gum. Liquidamber. Red Gum. Bilsted.

Fairfield County, Connecticut, and southern Indiana and Illinois, southward to Cape Canaveral and Tampa Bay, Florida, and the valley of the Trinity River, Texas; in central and southern Mexico.

A large tree, often 30 to 36 metres, or exceptionally 48 metres, in height, with a trunk 1.20 to 1.80 metres in diameter; low, wet soil; very common and reaching its greatest development on the bottom-lands of the Mississippi Basin, — here, with the cotton-gum, forming a large proportion of the forest growth.

Wood heavy, hard, not strong, rather tough, close-grained, compact, inclined to shrink and warp badly in seasoning, susceptible of a beautiful polish; medullary rays numerous, very obscure; color bright brown tinged with red, the sap-wood nearly white; manufactured into lumber and used in the construction of buildings for plates, boarding, and clapboards, in cabinet work as a substitute for black walnut, and for veneering and street pavements.

The balsamic exudation obtained from this species at the South is collected by herbalists, and sometimes used in the form of a syrup as a substitute for storax in the treatment of catarrhal affections, or externally as an ointment.

RHIZOPHORACEÆ.

140. *Rhizophora Mangle*, L.

Mangrove.

Semi-tropical Florida, — Mosquito Inlet and Cedar Keys to the southern keys; Delta of the Mississippi River; coast of Texas; West Indies and tropical America; and now widely naturalized throughout the tropics of the Old World.

A tree 12 to 18 metres, or exceptionally 27 metres, in height, with a trunk 0.30 to 0.60 metre in diameter, or more commonly not exceeding 4 to 7 metres in height; low saline shores, reaching, in the United States, its greatest development on Bay Biscayne and Cape Sable; south of latitude 29°, bordering with almost impenetrable thickets the coast of the Florida peninsula, ascending the rivers for many miles, especially those flowing from the Everglades, and entirely covering many of the southern keys.

Wood exceedingly heavy, hard, and strong, close-grained, checking in drying, satiny, susceptible of a beautiful polish, containing many evenly distributed rather small open ducts; medullary rays numerous, thin; color dark reddish brown streaked with lighter brown, the sap-wood lighter; used for wharf piles and furnishing valuable fuel.

COMBRETACEÆ.

141. *Conocarpus erecta*, L.

Buttonwood.

Semi-tropical Florida, — Cape Canaveral and Tampa Bay to the southern keys; through the West Indies to Brazil.

A low tree, often 8 metres, or exceptionally 15 to 18 metres, in height, with a trunk sometimes 0.60 metre in diameter; common, and reaching its greatest development, in the United States, on Lost Man's River, north of Cape Sable; or sometimes reduced to a low under-shrub.

Wood very heavy and hard, strong, close-grained, very compact, suscep-

tible of a beautiful polish; medullary rays numerous, obscure; color dark yellow-brown, the sap-wood lighter; burning slowly like charcoal, and highly valued for fuel.

142. *Laguncularia racemosa*, Gært. f.

White Buttonwood. White Mangrove.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast, Cedar Keys to Cape Sable; West Indies and tropical America; coast of tropical Africa.

A small tree, sometimes 6 to 22 metres in height, with a trunk 0.30 to 0.60 metre in diameter, or toward its northern limits reduced to a low shrub; very common; saline shores of lagoons and bays.

Wood very heavy and hard, strong, close-grained, very compact; susceptible of a beautiful polish; medullary rays numerous, obscure; color dark yellow-brown, the sap-wood much lighter.

MYRTACEÆ.

143. *Calyptanthus Chytraculia*, Sw.

Semi-tropical Florida, — shores of Bay Biscayne, Key Largo; in the West Indies.

A small tree, sometimes 8 metres in height, with a trunk 0.10 to 0.15 metre in diameter.

Wood very heavy, hard, close-grained, compact, containing many evenly distributed rather large open ducts; medullary rays numerous, thin; color brown tinged with red, the sap-wood a little lighter.

144. *Eugenia buxifolia*, Willd.

Gurgeon Stopper. Spanish Stopper.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast, Caloosa River to Cape Romano; in the West Indies.

A small tree, rarely 6 to 9 metres in height, with a trunk sometimes 0.30 metre in diameter, reaching its greatest development, in the United States, on the rich hummocks of the Everglades.

Wood very heavy, exceedingly hard, very strong, close-grained, very compact; medullary rays numerous, thin; color dark brown shaded with red, the sap-wood a little lighter; somewhat used for fuel.

145. *Eugenia dichotoma*, DC.

Naked-wood.

Semi-tropical Florida, — Mosquito Inlet to Cape Canaveral, common, west coast, Caloosa River to Cape Romano; in the West Indies.

A small tree, sometimes 6 to 8 metres in height, with a trunk rarely 0.15 metre in diameter.

Wood very heavy, hard, close-grained, compact; medullary rays numerous, thin; color light brown or red, the sap-wood yellow.

The small, edible fruit of agreeable aromatic flavor.

146. *Eugenia monticola*, DC.

Stopper. White Stopper.

Saint John's River to Umbrella Key, Florida, rare; in the West Indies.

A small tree, rarely 7 metres in height, with a trunk 0.30 metre in diameter, or in northern Florida reduced to a low shrub.

Wood very heavy, hard and strong, very close-grained, compact; medullary rays numerous, thin; color brown often tinged with red, the sap-wood darker.

147. *Eugenia longipes*, Berg.

Stopper.

Semi-tropical Florida, — No Name Key; in the West Indies.

A small tree, 4 to 7 metres in height, with a trunk 0.15 to 0.20 metre in diameter; rare.

Wood very heavy, hard, close-grained, checking badly in drying, containing many evenly distributed open ducts; medullary rays numerous, very obscure; color dark brown or nearly black, the sap-wood brown tinged with red.

148. *Eugenia procera*, Poir.

Red Stopper.

Semi-tropical Florida, — Bay Biscayne to the southern keys; in the West Indies.

A tree 12 to 18 metres in height, with a trunk 0.30 to 0.45 metre in diameter; often forming extensive groves, and reaching its greatest development, in the United States, in the neighborhood of Miami, Bay Biscayne.

Wood very heavy, exceedingly hard, very strong and close-grained, compact; medullary rays numerous, hardly distinguishable; color light yellow-brown, the sap-wood darker.

CACTACEÆ.

149. *Cereus giganteus*, Engelm.

Succarow. Saguaro. Giant Cactus.

Valley of Bill Williams Fork, Arizona, south and east through central Arizona to the valley of the San Pedro River; southward in Sonora.

A tall, columnar tree, 8 to 18 metres in height, with a trunk sometimes 0.60 metre in diameter; dry, stony slopes, or low hills rising from the desert.

Wood of the large strong ribs very light, soft, rather coarse-grained, solid, satiny, susceptible of a fine polish, almost indestructible in contact with the ground; medullary rays very numerous, broad; color light brown tinged with yellow; used in the region almost exclusively for the rafters of adobe houses, for fencing, and by the Indians for lances, bows, etc.

The edible fruit is largely collected and dried by the Indians.

CORNACEÆ.

150. *Cornus alternifolia*, L. f.

Dogwood.

New Brunswick, west along the valley of the Saint Lawrence River to the northern shores of Lake Superior, south through the northern States and along the Alleghany Mountains to northern Georgia and Alabama.

A small tree, 4 to 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter; low, rich woods, and borders of streams and swamps.

Wood heavy, hard, close-grained, checking badly in drying; medullary rays numerous, thin; color brown tinged with red, the sap-wood light yellow.

151. *Cornus florida*, L.

Flowering Dogwood. Boxwood.

Southern New England, southern Ontario, southern Minnesota, and through the Atlantic forests to middle Florida, and the valley of the Brazos River, Texas.

A small tree, 9 to 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or toward its northern limits reduced to a low shrub; rich woods, common, especially at the south.

Wood heavy, hard, strong, close-grained, tough, checking badly in drying, satiny, susceptible of a beautiful polish. medullary rays numerous, conspicuous; color brown, changing in different specimens to shades of green and red, the sap-wood lighter; used in turnery, for wood engraving and the bearings of machinery, hubs of wheels, barrel-hoops, etc.

The bark, especially of the root, in common with that of the other species of the genus, possesses bitter tonic properties, and is used in the form of decoctions, etc., in the treatment of intermittent and malarial fevers.

152. *Cornus Nuttallii*, Audubon.

Flowering Dogwood.

Vancouver's Island, through western Washington and Oregon, and southward in California along the western slope of the Sierra Nevada and through the Coast Ranges to the San Bernardino Mountains.

A small, slender tree, sometimes 18 to 24 metres in height, with a trunk rarely 0.45 metre in diameter; reaching in the Cascade Mountains an

elevation of 3,000 feet, and in the San Bernardino Mountains, of from 4,000 to 5,000 feet; common; rich, rather damp soil, generally in the dense shade of coniferous forests.

Wood heavy, exceedingly hard, strong, close-grained, compact, satiny, susceptible of a good polish; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood lighter; somewhat used in cabinet-making, for mauls, handles, etc.

153. *Nyssa capitata*, Walt.

Ogeechee Lime. Sour Tupelo. Gopher Plum.

Valley of the Ogeechee River, Georgia, to western Florida, and in southern Arkansas.

A tree 9 to 18 metres in height, with a trunk 0.30 to 0.90 metre in diameter; deep swamps and river bottoms; rare and local.

Wood light, soft, not strong, tough, rather coarse-grained, compact, unwedgeable, containing many regularly distributed open ducts; medullary rays numerous, thin; color white, the sap-wood hardly distinguishable.

A conserve, under the name of "Ogeechee limes," is prepared from the large, acid fruit.

154. *Nyssa sylvatica*, Marsh.

Tupelo. Sour Gum. Pepperidge. Black Gum.

Southern Maine and northern Vermont, west to central Michigan, south to Tampa Bay, Florida, and the valley of the Brazos River, Texas.

A tree 15 to 36 metres in height, with a trunk 0.60 to 1.50 metres in diameter, or at the north much smaller; borders of swamps, or on rather high, rich hillsides and pine uplands; at the south often in pine-barren ponds and deep swamps, the base of the trunk then greatly enlarged and swollen (*N. aquatica*, L.).

Wood heavy, rather soft, strong, very tough, unwedgeable, difficult to work, inclined to check unless carefully seasoned, not durable in contact with the soil, containing numerous regularly distributed small open ducts; medullary rays numerous, thin; color light yellow or often nearly white, the sap-wood hardly distinguishable; now largely used for the hubs of wheels, rollers in glass-factories, ox-yokes, and on the Gulf coast for wharf-piles.

155. *Nyssa uniflora*, Wang.

Large Tupelo. Cotton-gum. Tupelo-gum.

Southern Virginia, south near the coast to the valley of the Saint Mary's River, Georgia, through the Gulf States to the valley of the Neches River, Texas, and through Arkansas and southern and south-eastern Missouri to southern Illinois.

A large tree, 21 to 30 metres in height, with a trunk 0.90 to 1.20 metres in diameter; deep swamps and bottom-lands subject to frequent

overflow ; one of the largest and most common trees of the bottom-lands of the lower Mississippi River basin, and reaching its greatest development in the cypress swamps of western Louisiana and eastern Texas, near the coast.

Wood light, soft, not strong, close-grained, compact, unwedgeable ; medullary rays numerous, thin ; color light brown, or often nearly white ; used in turnery and largely for wooden-ware ; that of the root for the floats of nets, etc., as a substitute for cork.

CAPRIFOLIACEÆ.

156. *Sambucus glauca*, Nutt.*Elder.*

Valley of the Fraser River and Vancouver's Island, British Columbia, south to the Mexican boundary, extending east to the Blue Mountains of Oregon and the Wahsatch Range, Utah.

A small tree, sometimes 8 to 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or toward its northern limits reduced to a large shrub ; mountain valleys, in dry, gravelly soil.

Wood light, soft, weak, coarse-grained, checking in drying ; medullary rays numerous, rather conspicuous ; color yellow tinged with brown, the sap-wood lighter.

157. *Sambucus Mexicana*, Presl.*Elder.*

Valley of the Nueces River, south through western Texas, west along the southern boundary of the United States to southern California ; in northern Mexico.

A small tree, sometimes 6 metres in height, with a trunk 0.15 to 0.25 metre in diameter ; bottom-lands, in moist, gravelly loam.

Wood light, soft, rather coarse-grained, compact ; medullary rays numerous, thin, conspicuous ; color light brown, the sap-wood lighter.

158. *Viburnum Lentago*, L.*Sheep-berry. Nanny-berry.*

Southern shores of Hudson Bay, west in British America to about longitude 102°, south through the northern States to Pennsylvania, southern Indiana, eastern Missouri, and along the Alleghany Mountains to northern Georgia.

A small tree, 6 to 9 metres in height, with a trunk sometimes 0.15 to 0.25 metre in diameter ; rocky ridges and borders of streams and swamps, in rich, moist soil ; most common and reaching its greatest development far north.

Wood heavy, hard, close-grained, compact, emitting a disagreeable odor; medullary rays thin, barely distinguishable; color dark orange-brown, the sap-wood nearly white.

159. *Viburnum prunifolium*, L.

Black Haw. Stag-bush.

Southern Connecticut and New York, south to middle Florida and the valley of the Colorado River, Texas; west to Missouri, Arkansas, and the Indian Territory.

A small tree, sometimes 6 to 9 metres in height, with a trunk rarely exceeding 0.15 metre in diameter, or at the north generally reduced to a low, much-branched shrub; rocky hillsides in rich soil.

Wood heavy, very hard, strong, brittle, close-grained, liable to check in drying; medullary rays numerous, very obscure; color brown tinged with red, the sap-wood nearly white.

RUBIACEÆ.

160. *Exostema Caribæum*, Ræm. & Schultes.

Keys of semi-tropical Florida; in the West Indies.

A small tree, sometimes 7 metres in height, with a trunk 0.20 to 0.30 metre in diameter.

Wood very heavy, exceedingly hard, strong, close-grained, checking in drying, satiny, susceptible of a beautiful polish; medullary rays numerous, very obscure; color light brown beautifully streaked with different shades of yellow and brown, the sap-wood clear rich yellow.

161. *Pinckneya pubens*, Michx.

Georgia Bark.

South Carolina, near the coast; basin of the upper Apalachicola River in Georgia and Florida.

A small tree, 6 to 9 metres in height, with a trunk 0.15 to 0.30 metre in diameter; borders of streams and low, sandy swamps; rare and local.

Wood light, soft, weak, close-grained, checking badly in drying; layers of annual growth clearly marked by four to six rows of large open ducts; medullary rays few, obscure; color brown, the sap-wood lighter.

Infusions of the bark are successfully used in the treatment of intermittent fever, as a substitute for cinchona.

162. *Genipa clusiæfolia*, Griseb.

Seven-year Apple.

Southern keys of semi-tropical Florida; in the West Indies.

A small, much-branched, knotty tree, sometimes 6 metres in height,

with a trunk rarely exceeding 0.10 metre in diameter, or in Florida more often a shrub ; borders of saline shores.

Wood very heavy, hard, close-grained, compact, susceptible of a beautiful polish ; medullary rays numerous, thin ; color rich dark brown shaded with orange, the sap-wood light yellow.

163. Guettarda elliptica, Sw.

Southern keys of semi-tropical Florida ; in the West Indies.

A small tree, 4 to 7 metres in height, with a trunk rarely exceeding 0.20 metre in diameter.

Wood heavy, hard, very close-grained, checking in drying, satiny, susceptible of a beautiful polish, containing numerous scattered small open ducts ; medullary rays numerous, thin ; color light brown tinged with red.

ERICACEÆ.

164. Vaccinium arboreum, Marsh.

Farkle-berry.

North Carolina, south near the coast to middle Florida, through the Gulf States to Matagorda Bay, Texas, and through Arkansas and southern Missouri to southern Illinois.

A small tree, 7 to 9 metres in height, with a trunk rarely 0.25 metre in diameter, or toward its northern limits often reduced to a low shrub ; very common throughout the pine-belt of the Gulf States, along the larger ponds and streams, in moist sandy soil, and reaching its greatest development in eastern Texas near the coast.

Wood heavy, hard, very close-grained, compact, liable to twist in drying, satiny, susceptible of a beautiful polish ; medullary rays numerous, broad, conspicuous ; color light brown tinged with red, the sap-wood hardly distinguishable ; somewhat used in turnery in the manufacture of small handles, etc.

165. Andromeda ferruginea, Walt.

South Carolina to northern Florida, near the coast.

A small tree, 6 to 9 metres in height, with a trunk 0.15 to 0.25 metre in diameter, often crooked or semi-prostrate, rich hummocks ; or, in sandy pine-barren soil, reduced to a low shrub, 0.60 to 0.90 metre in height ; the leaves varying greatly in shape, venation, etc.

Wood heavy, hard, not strong, very close-grained, checking in drying, satiny, susceptible of a beautiful polish ; medullary rays numerous, thin ; color bright brown tinged with red, the sap-wood a little lighter.

166. *Arbutus Menziesii*, Pursh.*Madroña.*

Islands of British Columbia, southward through Washington and Oregon, near the coast, and through the Coast Ranges of California to the Santa Lucia Mountains.

A small tree, sometimes 15 to 25 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or rarely much larger; south of San Francisco Bay smaller, often reduced to a low shrub; hillsides in rich soil.

Wood heavy, hard, strong, close-grained, checking in drying; medullary rays numerous, conspicuous; color light brown shaded with red, the sap-wood lighter; largely used in the manufacture of gunpowder, the bark in tanning.

167. *Arbutus Xalapensis*, HBK.

Southern Arizona, — Santa Rita Mountains, between 4,500 and 7,000 feet elevation; in northern Mexico.

A small tree, 9 to 12 metres in height, with a trunk 0.45 to 0.60 metre in diameter; dry, gravelly slopes; the large specimens generally hollow and defective.

Wood heavy, soft, not strong, brittle, close-grained, checking badly in drying, susceptible of a good polish; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood lighter.

168. *Arbutus Texana*, Buckley.

Western Texas, Hays and Travis Counties, west to the Guadalupe and Eagle Mountains, and southward, probably into northern Mexico.

A small tree, 5 to 6 metres in height, with a trunk 0.15 to 0.25 metre in diameter; dry limestone hills and ridges; rare and local.

Wood heavy, hard, close-grained, compact; medullary rays numerous, obscure; color brown, the sap-wood lighter, tinged with red; used in turnery, the manufacture of mathematical instruments, etc.

169. *Oxydendrum arboreum*, DC.*Sorrel Tree. Sour-wood.*

Western Pennsylvania, south along the Alleghany Mountains to western Florida and the eastern shores of Mobile Bay, west to middle Tennessee and western Louisiana.

A small tree, 12 to 18 metres in height, with a trunk 0.25 to 0.35 metre in diameter; usually in rather dry, gravelly soil.

Wood heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, thin; color brown tinged with red, the sap-wood somewhat lighter; used for the handles of tools, bearings of machinery, etc.

170. *Kalmia latifolia*, L.

Laurel. Calico-bush. Spoonwood. Ivy.

New Brunswick and the northern shores of Lake Erie, south to western Florida, and through the Gulf States to western Louisiana and the valley of the Red River, Arkansas.

A small tree, sometimes 9 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter, or more often a low shrub; rich woodlands; most common and reaching its greatest development in the southern Alleghany Mountains, here often forming dense, impenetrable thickets.

Wood heavy, hard, strong, brittle, close-grained, compact; principal medullary rays broad, dark brown, conspicuous; intermediate rays numerous, thin, inconspicuous; color brown tinged with red, the sap-wood somewhat lighter; used for tool-handles, in turnery, and for fuel.

171. *Rhododendron maximum*, L.

Great Laurel. Rose Bay.

Nova Scotia and the north shores of Lake Erie, south through New England, New York, and along the Alleghany Mountains to northern Georgia.

A small tree, sometimes 10 to 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter, or often a tall, straggling shrub; at the North in cold swamps; rare; very common and reaching its greatest development in the southern Alleghany Mountains, on steep, rocky banks of streams, etc.; never on limestone.

Wood heavy, hard, strong, brittle, close-grained, compact; medullary rays numerous, thin; color light clear brown, the sap-wood lighter; occasionally used in turnery for the handles of tools, etc.; a good substitute for boxwood in engraving.

MYRSINACEÆ.

172. *Myrsine Rapanea*, Ræm. & Schultes.

Semi-tropical Florida, — Indian River to the southern keys; through the West Indies to Brazil.

A small tree, in Florida rarely exceeding 8 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or often a shrub; borders of ponds and fresh-water creeks; in the West Indies much larger.

Wood heavy, hard, very close-grained, compact; medullary rays numerous, very conspicuous; color brown tinged with red, and beautifully striped with the darker medullary rays, the sap-wood hardly distinguishable.

173. *Ardisia Pickeringia*, Nutt.*Marl-berry. Cherry.*

Semi-tropical Florida, — Mosquito Inlet to the southern keys, west coast, Caloosa River to Cape Romano; in the West Indies and southern Mexico.

A small tree, sometimes 8 metres in height, with a trunk rarely 0.15 metre in diameter, or often a shrub; reaching its greatest development, in Florida, on the shores of Bay Biscayne.

Wood heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays very numerous, conspicuous; color rich brown, beautifully marked with the darker medullary rays, the sap-wood a little lighter.

174. *Jacquinia armillaris*, Jacq.*Joe-wood.*

Southern keys of semi-tropical Florida, rare; through the West Indies to Brazil.

A low, rigid tree, rarely exceeding in Florida 4 metres in height, with a trunk sometimes 0.15 metre in diameter; in the West Indies much larger.

Wood heavy, hard, coarse-grained, checking and shrinking badly in drying, containing many scattered large open ducts; medullary rays numerous, broad, conspicuous; color light clear brown tinged with yellow.

The saponaceous leaves are sometimes used as a substitute for soap.

SAPOTACEÆ.

175. *Chrysophyllum oliviforme*, Lam.

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast, Caloosa River to Cape Sable; rare; through the West Indies to Brazil.

A small tree, sometimes 9 metres in height, with a trunk 0.25 to 0.30 metre in diameter.

Wood very heavy, hard, strong, close-grained, checking in drying; medullary rays numerous, not conspicuous; color light brown shaded with red, the thin sap-wood a little lighter.

176. *Sideroxylon Mastichodendron*, Jacq.*Mastic.*

Semi-tropical Florida, — Cape Canaveral to the southern keys, west coast, Cape Romano to Cape Sable; in the West Indies.

A tree often 18 metres in height, with a trunk 0.60 to 0.90 metre in diameter; the largest and most valuable tree of semi-tropical Florida; common.

Wood very heavy, exceedingly hard, strong, close-grained, checking in drying, containing few scattered small open ducts; medullary rays numerous, not conspicuous; color bright orange, the sap-wood yellow; largely used in ship and boat building.

177. *Dipholis salicifolia*, A. DC.

Bustic. Cassada.

Semi-tropical Florida. — Bay Biscayne to the southern keys; through the West Indies to Brazil.

A tree sometimes 15 metres in height, with a trunk rarely 0.60 metre in diameter; the large specimens hollow and defective; rare.

Wood very heavy, exceedingly hard, very strong, close-grained, compact, checking in drying, susceptible of a beautiful polish, containing many scattered large open ducts; color dark brown or red, the sap-wood lighter.

178. *Bumelia tenax*, Willd.

North Carolina, southward near the coast to Cape Canaveral and Cedar Keys, Florida.

A small tree, 6 to 9 metres in height, with a trunk sometimes 0.15 metre in diameter; sandy soil.

Wood heavy, hard, not strong, very close-grained, compact, susceptible of a beautiful polish; well characterized, as in all the North American species, by large open ducts, defining, with several rows, the rings of annual growth, connected by conspicuous branching groups of similar ducts; medullary rays numerous, thin; color light brown streaked with white, the sap-wood lighter.

179. *Bumelia lanuginosa*, Pers.

Gum Elastic. Shittim-wood.

Georgia and northern Florida to Mobile Bay, Alabama; southern Illinois and southern Missouri, through Arkansas to the valley of the Rio Grande, Texas.

An evergreen tree, sometimes 18 metres in height, with a trunk 0.90 metre in diameter, or in the Atlantic States much smaller, rarely exceeding 6 metres in height; common and reaching its greatest development on the rich bottom-lands of eastern Texas.

Wood heavy, soft, weak, close-grained, very compact, the open ducts conspicuous; medullary rays numerous, thin; color light brown or yellow, the sap-wood lighter; somewhat used in cabinet-making.

180. *Bumelia spinosa*, A. DC.

Arizona, — Santa Catalina Mountains; Parras and Saltillo, Mexico.

A small tree, 6 to 7 metres in height, with a trunk 0.20 to 0.25 metre in diameter; dry, gravelly soil, near water-courses; rare.

Wood heavy, hard, very close-grained, compact, the open ducts conspicuous; medullary rays thin, obscure; color light rich brown or yellow, the sap-wood lighter.

181. *Bumelia lycioides*, Gært. f.

Iron-wood. Southern Buckthorn.

Coast of Virginia and southern Illinois, south to Mosquito Inlet and the Caloosa River, Florida, and through southern Missouri, Arkansas, and Texas to the valley of the Rio Concho.

A small tree, sometimes 9 to 12 metres in height, with a trunk rarely exceeding 0.15 metre in diameter; low, rich soil, or often, in the Atlantic and Gulf States, a low, semi-prostrate shrub (var. *reclinatum*, Gray).

Wood heavy, hard, not strong, close-grained, compact; medullary rays numerous, thin; color light brown or yellow, the sap-wood lighter.

182. *Bumelia cuneata*, Sw.

Ant's-wood. Downward Plum. Saffron Plum.

Semi-tropical Florida, — Indian River to the southern keys, not rare, west coast, Cedar Keys to Cape Romano, rare; rocky shores, and in the interior of low, barren keys; Texas, valley of the lower Rio Grande, and southward into northern Mexico; in the West Indies.

A small tree, rarely exceeding 4 metres in height, with a trunk sometimes 0.30 metre in diameter.

Wood heavy, hard, not strong, very close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, thin; color light brown or orange, the sap-wood lighter.

183. *Mimusops Sieberi*, A. DC.

Wild Dilly.

Southern keys of semi-tropical Florida, common; in the West Indies.

A small, low, gnarled tree, sometimes 9 metres in height, with a trunk 0.30 to 0.40 metre in diameter; generally hollow and defective.

Wood very heavy, hard, strong, close-grained, inclined to check in drying, susceptible of a beautiful polish; medullary rays numerous, very obscure; color rich, very dark brown, the sap-wood lighter.

EBENACEÆ.

184. *Diospyros Virginiana*, L.

Persimmon.

Shores of Long Island Sound in Connecticut and New York, and southern Ohio southward to Bay Biscayne and the Caloosa River, Florida, and the valley of the Colorado River, Texas, extending to southeastern Iowa, eastern Kansas, and the Indian Territory.

A tree 10 to 20 or, exceptionally, 30 to 35 metres in height, with a trunk sometimes 0.60 metre in diameter; very common and often entirely occupying abandoned fields in the middle and lower regions of the southern Atlantic and Gulf States, reaching its greatest development on the rich bottom-lands of the lower Ohio basin.

Wood heavy, hard, strong, very close-grained, compact, susceptible of a high polish, containing few scattered open ducts; layers of annual growth marked by one or more rows of similar ducts; medullary rays numerous, conspicuous; color dark brown or often nearly black, the thick sap-wood light brown, often containing numerous darker spots; used in turnery for shoe-last, plane-stocks, etc., and preferred for shuttles; the dark heart-wood only developed in very old specimens and rarely seen.

The yellow edible fruit is exceedingly austere until after frost, then becoming sweet and luscious, or in the Gulf States ripening in August without austerities.

A decoction of the bitter and astringent unripe fruit and inner bark is occasionally used in the treatment of diarrhoea, sore throat, hemorrhage, etc.

185. *Diospyros Texana*, Scheele.

Black Persimmon. Mexican Persimmon. Chapote.

Western Texas, — Matagorda Bay to the valley of the Concho River; in northern Mexico.

A small tree, 4 to 10 metres in height, with a trunk sometimes 0.30 metre in diameter, or more often a low shrub; not rare, and reaching its greatest development, in Texas, on the bottom-lands of the Guadalupe River; borders of prairies, in rich soil; in Mexico more common and of larger size.

Wood heavy, hard, very close-grained, compact, satiny, taking a beautiful polish, containing few minute scattered open ducts; medullary rays numerous, thin; color nearly black, often streaked with yellow, the thick sap-wood clear bright yellow; used in turnery for the handles of tools, etc., suitable for wood-engraving, and probably the best substitute among American woods for boxwood.

The small, black fruit sweet and insipid.

STYRACACEÆ.

186. *Symlocos tinctoria*, L'Her.

Horse Sugar. Sweet-leaf.

Southern Delaware, south to middle Florida, and west through the Gulf States to western Louisiana and southern Arkansas.

A small tree, 6 to 10 metres in height, with a trunk 0.20 to 0.25 metre in diameter, or often a low shrub; borders of cypress swamps or in deep, damp, shaded woods.

Wood light, soft, not strong, close-grained, checking in drying; medullary rays numerous, thin; color light red or often nearly white, the sap-wood lighter.

The sweet leaves are greedily eaten by cattle and horses, and yield, as well as the bark, a yellow dye.

187. *Halesia diptera*, L.

Snowdrop Tree. Silver-bell Tree.

South Carolina to northern Florida, near the coast, and west through the lower region of the Gulf States to eastern Texas and central Arkansas.

A small tree, sometimes 6 to 10 metres in height, with a trunk 0.10 to 0.20 metre in diameter, or often a shrub sending up many clustered stems from the root; borders of swamps in low, wet woods.

Wood light, soft, strong, very close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood lighter.

188. *Halesia tetraptera*, L.

Rattle-box. Snowdrop Tree. Silver-bell Tree. Calico-wood.

Mountains of West Virginia to southern Illinois, south to middle Florida, central Alabama and Mississippi, and through Arkansas to western Louisiana and eastern Texas.

A tree 10 to 15 metres in height, with a trunk rarely 0.60 metre in diameter, or often a tall shrub; generally along streams, in rich soil; most common and reaching its greatest development on the southern Alleghany Mountains.

Wood light, soft, close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood lighter.

OLEACEÆ.

189. *Fraxinus Greggii*, Gray.

Western Texas, — valley of the Rio Grande from the San Pedro to the Pecos River; in northern Mexico.

A small tree, sometimes 7 to 9 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or often a graceful shrub; limestone soil.

Wood heavy, hard, very close-grained, compact; layers of annual growth and medullary rays obscure; color brown, the sap-wood lighter.

190. *Fraxinus anomala*, Torr.

Southwestern Colorado to southern Utah.

A small tree, sometimes 6 metres in height, with a trunk 0.15 to 0.20 metre in diameter; common on elevated sandstone slopes.

Wood heavy, hard, coarse-grained, containing many large open scattered ducts; layers of annual growth marked by several rows of similar

ducts ; medullary rays numerous, thin ; color light brown, the sap-wood lighter.

191. *Fraxinus pistaciæfolia*, Torr.

Ash.

Mountains of western Texas, southern New Mexico, and southern and eastern Arizona, to southern Nevada ; in northern Mexico.

A small tree, 10 to 12 metres in height, with a trunk rarely 0.45 metre in diameter ; generally along borders of streams, in elevated cañons, less commonly in dry soil, the foliage then thick and coriaceous or, more rarely, velvety tomentose (var. *coriacea*, Gray) ; the large specimens generally hollow and defective.

Wood heavy, soft, not strong, coarse-grained, compact ; medullary rays numerous, thin ; color light brown, the sap-wood lighter ; occasionally used in wagon-building, for axe handles, etc.

192. *Fraxinus Americana*, L.

White Ash.

Nova Scotia, New Brunswick, southern Ontario to northern Minnesota, south to northern Florida, central Alabama and Mississippi, and west to eastern Nebraska, Kansas, the Indian Territory, and the valley of the Devil's River, Texas.

A large tree of the first economic value, 15 to 30 or, exceptionally, 42 metres in height, with a trunk 1.20 to 1.80 metres in diameter ; low, rich, rather moist soil, reaching its greatest development on the bottom-lands of the lower Ohio River Basin ; toward its western and southwestern limits smaller, of less economic value, and generally replaced by the green ash (*Fraxinus viridis*). The form of western Texas (var. *Texensis*, Gray), with smaller fruit, and generally 5 short, ovate leaflets, is a small tree, with harder, heavier, and more compact wood.

Wood heavy, hard, strong, ultimately brittle, coarse-grained, compact ; layers of annual growth clearly marked by several rows of large open ducts, which in slowly grown specimens occupy nearly the entire width of the annual rings ; medullary rays numerous, obscure ; color brown, the sap-wood much lighter, often nearly white ; largely used in the manufacture of agricultural implements, carriages, handles, oars, and for interior and cabinet work.

193. *Fraxinus pubescens*, Lam.

Red Ash.

New Brunswick to southern Ontario and northern Minnesota, south to northern Florida and central Alabama.

A tree 12 to 15 metres in height, with a trunk rarely exceeding 0.60 metre in diameter ; borders of streams and swamps, in low ground ; common and reaching its greatest development in the north Atlantic States ;

rare west of the Alleghany Mountains, probably not extending west of the Mississippi River.

Wood heavy, hard, strong, brittle, coarse-grained, compact; medullary rays numerous, thin; color rich brown, the sap-wood light brown streaked with yellow; somewhat used as a substitute for the more valuable white ash, with which it is often confounded.

194. *Fraxinus viridis*, Michx. f.

Green Ash.

Shores of Lake Champlain, Rhode Island and southward to northern Florida, west to the valley of the Saskatchewan, the eastern ranges of the Rocky Mountains of Montana, the Wahsatch Mountains of Utah, and the ranges of eastern and northern Arizona.

A tree 15 to 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; borders of streams or in low, rather moist soil; at the West confined to the bottom-lands of the large streams and to high mountain cañons. A form with 3 to 5 leaflets, common in Texas west of the Colorado River and extending into Mexico, is var. *Berlandieriana*, Torr.

Wood heavy, hard, strong, brittle, rather coarse-grained, compact, satiny, containing numerous scattered small open ducts, the layers of annual growth marked by several rows of larger ducts; medullary rays numerous, obscure; color brown, the sap-wood lighter.

195. *Fraxinus platycarpa*, Michx.

Water Ash.

Southeastern Virginia, south near the coast to Cape Canaveral and the Caloosa River, Florida, west through the Gulf States to the valley of the Sabine River, Texas, and the Washita River, southwestern Arkansas; in the West Indies.

A small tree, 9 to 12 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; deep river swamps.

Wood very light, soft, not strong, brittle, close-grained, compact, the open ducts not conspicuous; medullary rays few, obscure; color nearly white or sometimes tinged with yellow, the sap-wood lighter.

196. *Fraxinus quadrangulata*, Michx.

Blue Ash.

Southern Michigan to central Minnesota, south to northern Alabama, and through Iowa and Missouri to northeastern Arkansas.

A tree 18 to 25 or, exceptionally, 37 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; generally on limestone hills, rarely extending to bottom-lands, and reaching its greatest development in the basin of the lower Wabash River.

Wood heavy, hard, not strong, brittle, close-grained, compact, satiny; layers of annual growth clearly marked by one to three rows of large

open ducts; medullary rays numerous, obscure; color light yellow streaked with brown, the sap-wood lighter; largely used for flooring, in carriage-building, etc.

197. *Fraxinus Oregana*, Nutt.

Oregon Ash.

Shores of Puget Sound, south through Washington and Oregon west of the eastern valleys of the Cascade Mountains, along the California Coast Ranges to San Francisco Bay and the western slopes of the Sierra Nevada to the San Bernardino and Hot Spring Mountains, California.

A tree sometimes 24 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; moist soil, generally along streams, and reaching its greatest development on the bottom-lands of southwestern Oregon.

Wood light, hard, not strong, brittle, coarse-grained, compact, containing many large open scattered ducts, the layers of annual growth strongly marked with several rows of similar ducts; medullary rays numerous, thin; color brown, the sap-wood lighter; used in the manufacture of furniture, for the frames of carriages and wagons, in cooperage, for fuel, etc.

198. *Fraxinus sambucifolia*, Lam.

Black Ash. Hoop Ash. Ground Ash.

Southern Newfoundland and northern shores of the Gulf of Saint Lawrence, southwesterly to the eastern shores of Lake Winnipeg, south through the northern States to northern Delaware, the mountains of Virginia, southern Illinois, and northwestern Arkansas.

A tree 25 to 30 metres in height, with a trunk 0.30 to 0.60 metre in diameter; swamps and low river banks.

Wood heavy, soft, not strong, tough, rather coarse-grained, compact, durable, separating easily into thin layers; layers of annual growth strongly marked by several rows of large open ducts; medullary rays numerous, thin; color dark brown, the sap-wood light brown or often nearly white; largely used for interior finish, fencing, barrel-hoops, in cabinet-making, and the manufacture of baskets.

199. *Forestiera acuminata*, Poir.

Privet.

Southwestern Georgia, western Florida, through the Gulf States to the valley of the Colorado River, Texas, and northward through Arkansas to southern Missouri and southwestern Illinois.

A small tree, 6 to 8 metres in height, with a trunk rarely 0.20 metre in diameter; borders of swamps and streams, in low, wet soil; common in the Gulf region, near the coast, and reaching its greatest development in southern Arkansas.

Wood heavy, soft, not strong, brittle, close-grained, compact; medullary rays numerous, thin, rather conspicuous; color light yellow streaked with brown; the sap-wood lighter.

200. *Chionanthus Virginica*, L.

Fringe Tree. Old Man's Beard.

Southeastern Pennsylvania, south to Tampa Bay, Florida, and through the Gulf States to southern Arkansas and the valley of the Brazos River, Texas.

A small tree, 6 to 10 metres in height, with a trunk 0.15 to 0.20 metre in diameter; generally along streams, in low, rich soil.

Wood heavy, hard, close-grained, compact; layers of annual growth marked by several rows of large open ducts, connected as in that of *Bumelia* by branching groups of similar ducts; medullary rays numerous, obscure; color light brown, the sap-wood lighter.

A decoction of the tonic and anti-periodic bark of the root is sometimes employed in the treatment of intermittent fevers.

201. *Osmanthus Americanus*, Benth. & Hook.

Devil-wood.

Southern Virginia, south to Cape Canaveral and Tampa Bay, Florida, and through the Gulf States to eastern Louisiana, near the coast.

A small tree, 10 to 15 metres in height, with a trunk sometimes 0.30 metre in diameter; borders of streams and pine-barren swamps, in moist, rich soil.

Wood heavy, very hard and strong, close-grained, unwedgeable, difficult to work, containing many radiating groups of open cells parallel to the thin obscure medullary rays; color dark brown, the thick sap-wood light brown or yellow.

BORRAGINACEÆ.

202. *Cordia Sebestena*, L.

Geiger Tree.

Southern keys of semi-tropical Florida; rare; in the West Indies.

A small tree, sometimes 8 metres in height, with a trunk 0.06 to 0.08 metre in diameter; rich hummock soil.

Wood heavy, hard, close-grained, compact, satiny, containing few scattered small open ducts; medullary rays very numerous, thin, conspicuous; color dark brown, the thick sap-wood light brown or yellow.

203. *Cordia Boissieri*, A. DC.

Texas, — valley of the Rio Grande, westward to New Mexico; in northern Mexico.

A small tree, rarely 8 metres in height, with a trunk 0.12 to 0.15 metre in diameter, or more often reduced to a low shrub.

Wood light, rather soft, close-grained, compact, containing many small scattered open ducts; medullary rays very numerous, thin, conspicuous; color dark brown, the sap-wood light brown.

204. *Bourreria Havanensis*, Miers.

Strong Back.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, 10 or, exceptionally, 15 metres in height, with a trunk 0.20 to 0.25 metre in diameter; the large specimens generally hollow and defective. A form (generally shrubby in Florida) with scabrous or hispidulous leaves is var. *radula*, Gray.

Wood heavy, very hard, strong, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, obscure; color brown streaked with orange, the sap-wood not distinguishable.

205. *Ehretia elliptica*, DC.

Knack-away. Anaqua.

Texas, — Corpus Christi to New Braunfels, and southward to the valley of the lower Rio Grande.

A tree 10 to 15 metres in height, with a trunk sometimes 0.50 metre in diameter; borders of streams, in rich loam, and reaching its greatest development between the Guadalupe and Nueces Rivers.

Wood heavy, hard, not strong, very close-grained, compact, unwedgeable, containing many small open ducts arranged in numerous concentric rings within the layers of annual growth, these marked by several rows of larger ducts; medullary rays numerous, thin; color light brown, the sap-wood a little lighter.

BIGNONIACEÆ.

206. *Catalpa bignonioides*, Walt.

Catalpa. Catawba. Bean Tree. Cigar Tree. Indian Bean.

Southwestern Georgia, western Florida, and through central Alabama and Mississippi.

A low, much-branched tree, 12 to 15 metres in height, with a trunk 0.50 to 0.75 metre in diameter; borders of streams and swamps, in rich loam; rare and local; long cultivated for ornament, and now extensively naturalized in the middle and southern Atlantic States.

Wood light, soft, not strong, coarse-grained, compact, very durable in contact with the soil; layers of annual growth clearly marked by many rows of large open ducts; medullary rays numerous, obscure; color light brown, the thin sap-wood lighter, often nearly white; used and highly valued for fence-posts, rails, etc.

207. *Catalpa speciosa*, Warder.*Western Catalpa.*

Southern Illinois and Indiana, western Kentucky and Tennessee to southeastern Missouri and western Arkansas.

A tree 20 to 35 or, exceptionally, 45 metres in height, with a trunk 1 to 2 metres in diameter; borders of streams and swamps, on rich bottom-lands; common and reaching its greatest development in the valley of the lower Wabash River; cultivated and now widely naturalized in southern Arkansas, western Louisiana, and eastern Texas.

Wood light, soft, not strong, coarse-grained, compact, very durable in contact with the soil; layers of annual growth clearly marked by several rows of large open ducts; medullary rays numerous, obscure; color brown, the thin sap-wood lighter; largely used for railway-ties, fence-posts, rails, etc., and adapted for cabinet work and interior finish.

208. *Chilopsis saligna*, D. Don.*Desert Willow.*

Valley of the Rio Grande, Texas, and west through southern New Mexico and Arizona to southern California; in northern Mexico.

A small tree, 6 to 8 metres in height, with a trunk sometimes 0.30 metre in diameter; slopes and banks of depressions and water-courses in the desert; the large specimens generally hollow and defective.

Wood light, soft, not strong, close-grained, checking in drying, containing many scattered small open ducts; the layers of annual growth marked by several rows of larger ducts; medullary rays numerous, obscure; color brown streaked with yellow, the sap-wood much lighter.

209. *Crescentia cucurbitina*, L.*Black Calabash-tree.*

Semi-tropical Florida, — near Miami, and on Little River; in the West Indies.

A small tree, in Florida rarely exceeding 6 metres in height, with a trunk 0.10 to 0.12 metre in diameter.

Wood heavy, hard, very close-grained, compact, containing many small regularly distributed open ducts; medullary rays thin, hardly distinguishable; color light brown tinged with orange, the sap-wood lighter.

VERBENACEÆ.

210. *Citharexylum villosum*, Jacq.*Fiddle-wood.*

Semi-tropical Florida, — Cape Canaveral to the southern keys; in the West Indies and Mexico.

A small tree, rarely exceeding in Florida 6 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or north of Bay Biscayne reduced to a low much-branched shrub; common and reaching, within the United States, its greatest development on the shores of Bay Biscayne, Lost Man's River, etc.

Wood heavy, exceedingly hard, strong, close-grained, compact, susceptible of a fine polish, containing numerous small regularly distributed open ducts; color clear bright red, the sap-wood lighter.

211. *Avicennia nitida*, Jacq.

Black Mangrove. Black Tree. Black-wood.

Florida coast, — Saint Augustine to the southern keys, and Cedar Keys to Cape Sable; deltas of the Mississippi River; through the West Indies to Brazil.

A tree 6 to 9 metres in height, with a trunk 0.25 to 0.30 metre in diameter, or, exceptionally, 20 to 23 metres in height, with a trunk 0.60 metre in diameter; north of Mosquito Inlet reduced to a low shrub; common along saline shores and swamps, throwing up many leafless corky stems, and forming, with the red mangrove (*Rhizophora*), impenetrable thickets, or, more rarely, scattered and round-headed; reaching its greatest development, in the United States, on the west coast of Florida, north of Cape Sable.

Wood very heavy, hard, rather coarse-grained, compact; the eccentric layers of annual growth marked by several rows of large open ducts; medullary rays numerous, thin; color dark brown or nearly black, the sap-wood brown.

NYCTAGINACEÆ.

212. *Pisonia obtusata*, Sw.

Pigeon-wood. Beef-wood. Cork-wood. Pork-wood.

Semi-tropical Florida, — Cape Canaveral to the southern keys; in the West Indies.

A tree 9 to 15 metres in height, with a trunk 0.25 to 0.45 metre in diameter; saline shores and beaches.

Wood heavy, rather soft, weak, coarse-grained, compact, containing numerous large open ducts; layers of annual growth and medullary rays hardly distinguishable; color yellow tinged with brown, the sap-wood darker.

POLYGONACEÆ.

213. *Coccoloba Floridana*, Meisn.

Pigeon Plum.

Semi-tropical Florida, — Cape Canaveral to the southern keys, and from Cape Romano to Cape Sable.

A tree 15 to 18 metres in height, with a trunk 0.30 to 0.60 metre in diameter; one of the largest and most common trees of the region.

Wood very heavy, exceedingly hard, strong, brittle, very close-grained, inclined to check in drying, containing few small scattered open ducts; layers of annual growth and numerous medullary rays obscure; color rich dark brown tinged with red, the sap-wood lighter; valuable and somewhat used in cabinet-making.

214. *Coccoloba uvifera*, Jacq.

Sea Grape.

Semi-tropical Florida, — Mosquito Inlet to the southern keys, west coast, Tampa Bay to Cape Sable; through the West Indies to Brazil.

A low tree, rarely exceeding in Florida 4 metres in height, with a gnarled, contorted trunk often 0.90 to 1.20 metres in diameter, or reduced to a low, generally prostrate shrub; saline shores and beaches; common.

Wood very heavy, hard, very close-grained, inclined to check in drying, susceptible of a beautiful polish, containing few scattered rather small open ducts; layers of annual growth and numerous medullary rays hardly distinguishable; color rich dark brown or violet, the sap-wood lighter; valuable for cabinet-making.

LAURACEÆ.

215. *Persea Carolinensis*, Nees.

Red Bay.

Virginia south to Bay Biscayne and Cape Romano, Florida, and through the Gulf States to southern Arkansas and the valley of the Trinity River, Texas, near the coast.

A tree 15 to 20 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of streams and swamps, in low, rich soil. A form found near the coast from North Carolina to Alabama, well characterized by its longer flower-stalks densely covered, as well as the young shoots and under sides of the leaves, with a dense short brown tomentum, the wood orange-colored streaked with brown, is var. *palustris*, Chapm.

Wood heavy, hard, very strong, brittle, very close-grained, compact, susceptible of a beautiful polish, containing many evenly distributed open ducts; medullary rays numerous, thin; color bright red, the sap-wood much lighter; formerly somewhat used in ship-building, interior finish, and for cabinet work.

216. *Nectandra Willdenoviana*, Nees.

Lancewood.

Semi-tropical Florida, — Cape Canaveral and Cape Romano to the southern keys; in the West Indies and Central America.

A small tree, 6 to 9 metres in height, with a trunk rarely exceeding 0.15 metre in diameter; common and reaching its greatest development, in Florida, on the shores of Bay Biscayne and in the neighborhood of Cape Romano.

Wood heavy, hard, close-grained, checking in drying, containing many small regularly distributed open ducts; medullary rays numerous, thin; color rich dark brown, the sap-wood bright yellow.

217. *Sassafras officinale*, Nees.

Sassafras.

Eastern Massachusetts to southwestern Vermont, and west through southern Ontario and central Michigan to southeastern Iowa, eastern Kansas, and the Indian Territory; south to middle Florida, and the valley of the Brazos River, Texas.

A tree 12 to 15 metres in height, with a trunk 0.60 to 0.90 metre in diameter, exceptionally, 24 to 27 metres in height, with a trunk 1.80 to 2.25 metres in diameter, or toward its northern limits reduced to a small tree or shrub; rich, sandy loam, reaching its greatest development in southwestern Arkansas and the Indian Territory.

Wood light, soft, not strong, brittle, coarse-grained, very durable in contact with the soil, slightly aromatic, checking in drying; layers of annual growth clearly marked with three or four rows of large open ducts; medullary rays numerous, thin; color dull orange-brown, the thin sap-wood light yellow; used for light skiffs, ox-yokes, etc., and largely for fence posts and rails, and in cooperage.

The root, and especially its bark, enters into commerce, affording a powerful aromatic stimulant.

218. *Umbellularia Californica*, Nutt.

Mountain Laurel. California Laurel. Spice Tree. Cagiput.
California Olive. California Bay-tree.

Southwestern Oregon, south through the California Coast Ranges, and along the western slopes of the Sierra Nevada Mountains.

An evergreen tree, 24 to 30 metres in height, with a trunk 1.20 to 1.80 metres in diameter, or toward its southern limits and at high elevations a small tree or shrub; most common and reaching its greatest development in the rich valleys of southwestern Oregon.

Wood heavy, hard, strong, close-grained, compact, susceptible of a beautiful polish, containing numerous small regularly distributed open ducts; medullary rays numerous, thin; color rich light brown, the sap-wood lighter; used on the Oregon coast in ship-building, for jaws, bits, cleats, cross-trees, etc., and the most valuable material produced in the Pacific forests for interior and cabinet work.

EUPHORBIACEÆ.

219. *Drypetes crocea*, Poit.*Guiana Plum. White-wood.*

Semi-tropical Florida, — Bay Biscayne to the southern keys; in the West Indies.

A small tree, sometimes 9 metres in height, with a trunk 0.12 to 0.17 metre in diameter. A little-known form (var. *latifolia*, Müll.) with whitish warty branches, the calyx 5-parted, and more coriaceous leaves, should perhaps be considered a distinct species (*D. glauca*, Nutt.).

Wood heavy, hard, not strong, brittle, close-grained, checking in drying; medullary rays numerous, thin; color rich dark brown, the sap-wood yellow.

220. *Sebastiania lucida*, Müll.*Crab-wood. Poison-wood.*

Semi-tropical Florida, — Bay Biscayne to the southern keys; common; in the West Indies.

A small tree, sometimes 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter; the large specimens generally hollow and decayed.

Wood very heavy, hard, very close-grained, compact, susceptible of a beautiful polish; medullary rays numerous, obscure; color rich dark brown streaked with yellow, the sap-wood bright yellow; now largely manufactured into canes and furnishing valuable fuel.

221. *Hippomane Mancinella*, L.*Manchineel.*

Southern keys of semi-tropical Florida; common; in the West Indies and Central America.

A small tree, in Florida rarely exceeding 4 metres in height, with a trunk 0.12 to 0.17 metre in diameter; abounding in white milky exceedingly caustic poisonous sap.

Wood light, soft, close-grained, compact, containing numerous evenly distributed small open ducts; medullary rays numerous, obscure; color dark brown, the thick sap-wood light brown or yellow.

URTICACEÆ.

222. *Ulmus crassifolia*, Nutt.*Cedar Elm.*

Southern Arkansas, and Texas to the valley of the Rio Grande.

A tree 18 to 20 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or toward its southern or southwestern limits much smaller;

borders of streams, in rich soil; one of the most common and valuable timber-trees of Texas west of the Trinity River, and reaching its greatest development in the valleys of the Guadalupe and Trinity Rivers.

Wood heavy, hard, not strong, brittle, very close-grained, compact; layers of annual growth and medullary rays obscure; marked, in common with that of all the North American species, by concentric circles of irregularly arranged groups of small open ducts; color light brown tinged with red, the heavier sap-wood lighter; used in the manufacture of wagon-hubs, saddle-trees, chairs, etc., and very largely for fencing.

223. *Ulmus fulva*, Michx.

Red Elm. Slippery Elm. Moose Elm.

Valley of the lower Saint Lawrence River to northern Dakota, south to northern Florida, central Alabama and Mississippi, and the valley of the San Antonio River, Texas.

A tree 15 to 20 metres in height, with a trunk 0.45 to 0.60 metre in diameter; borders of streams and hillsides in rich soil.

Wood heavy, hard, strong, very close-grained, compact, durable in contact with the ground, splitting readily when green; layers of annual growth clearly marked by several rows of large open ducts; medullary rays numerous, thin; color dark brown or red, the thin sap-wood lighter; largely used for wheel-stock, fence-posts, rails, railway-ties, sills, etc.

The inner bark mucilaginous, nutritious, and extensively used in various medicinal preparations.

224. *Ulmus Americana*, L.

White Elm. American Elm. Water Elm.

Southern Newfoundland to the northern shores of Lake Superior and the eastern slope of the Rocky Mountains, in about latitude 52° N.; south to Cape Canaveral and Pease Creek, Florida, extending west in the United States to the Black Hills of Dakota, central Nebraska, the Indian Territory, and the valley of the Rio Concho, Texas.

A large tree, 30 to 35 metres in height, with a trunk 1.80 to 2.70 metres in diameter; rich, moist soil, borders of streams, etc.; toward its western and southwestern limits only on bottom-lands.

Wood heavy, hard, strong, tough, rather coarse-grained, compact, difficult to split; layers of annual growth clearly marked by several rows of large open ducts; medullary rays numerous, thin; color light brown, the sap-wood somewhat lighter; largely used for wheel-stock, saddle-trees, flooring, in cooerage, and in boat and ship building.

225. *Ulmus racemosa*, Thomas.

Rock Elm. Cork Elm. Hickory Elm. White Elm. Cliff Elm.

Southwestern Vermont, through western New York, Ontario, and southern Michigan to northeastern Iowa, and south through Ohio to central Kentucky.

A large tree, 20 to 30 metres in height, with a trunk sometimes 0.90 metre in diameter; low, wet clay, rich uplands or rocky declivities and river cliffs; common and reaching its greatest development in southern Ontario and the southern peninsula of Michigan.

Wood heavy, hard, very strong, tough, very close-grained, compact, susceptible of a beautiful polish; layers of annual growth marked with one or two rows of small open ducts; medullary rays numerous, obscure; color light clear brown often tinged with red, the thick sap-wood much lighter; largely used in the manufacture of heavy agricultural implements, wheel-stock, and for railway-ties, bridge-timbers, sills, etc.

226. *Ulmus alata*, Michx.

Wahoo. Winged Elm.

Southern Virginia, south through the middle districts to western Florida, through the Gulf States to the valley of the Trinity River, Texas, extending north through the eastern portions of the Indian Territory, Arkansas, and southern Missouri to southern Indiana and Illinois.

A small tree, 7 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter; generally in dry, gravelly soil, or rarely along the borders of swamps and bottom-lands; most common and reaching its greatest development in southern Missouri and Arkansas.

Wood heavy, hard, not strong, very close-grained, compact, unwedgeable; medullary rays distant, not conspicuous; color brown, the sap-wood lighter largely used for hubs, blocks, etc.

227. *Planera aquatica*, Gmel.

Valley of the Cape Fear River, North Carolina, south to western Florida, and through central Alabama and Mississippi to western Louisiana and the valley of the Trinity River, Texas, extending north through Arkansas and southern Missouri to central Kentucky and southern Illinois.

A small tree, 9 to 12 metres in height, with a trunk 0.30 to 0.60 metre in diameter; cold, deep, inundated river-swamps; rare in the Atlantic and eastern Gulf States; very common and reaching its greatest development in western Louisiana and southern Arkansas.

Wood light, soft, not strong, close-grained, compact, containing few scattered open ducts; medullary rays numerous, thin; color light brown, the sap-wood nearly white.

228. *Celtis occidentalis*, L.

Sugar-berry. Hackberry.

Valley of the Saint Lawrence River, west to eastern Dakota, south through the Atlantic region to Bay Biscayne and Cape Romano, Florida, and the valley of the Devil's River, Texas.

A large tree, 18 to 30 or, exceptionally, 36 to 39 metres in height, with a trunk 0.60 to 1.50 metres in diameter; most common and reaching its greatest development in the Mississippi River basin; rich bottoms or dry hillsides; sometimes reduced to a low shrub (*C. pumila*), and varying greatly in the size, shape, and texture of the leaves (*C. Mississippiensis levigata*, *integrifolia*, *crassifolia*, etc.); the extremes connected by innumerable intermediate forms, which, thus considered, make one polymorphous species of wide geographical range. A form with small thick coriaceous leaves with prominent reticulated veins, found from western Texas to southern California, and through the Rocky Mountains to eastern Oregon is var. *reticulata*, Sargent.

Wood heavy, rather soft, not strong, coarse-grained, compact, satiny, susceptible of a good polish; layers of annual growth clearly marked by several rows of large open ducts, containing many small groups of smaller ducts arranged in intermediate concentric rings; medullary rays numerous, thin; color clear light yellow, the sap-wood lighter; largely used for fencing and occasionally in the manufacture of cheap furniture.

229. *Ficus aurea*, Nutt.

Semi-tropical Florida, — Indian River to the southern keys.

A large parasitic tree, germinating on the trunks and branches of other trees, and sending down to the ground long aerial roots, which gradually grow together, kill the enclosed tree, and form a trunk sometimes 0.90 to 1.20 metres in diameter.

Wood exceedingly light, soft, very weak, coarse-grained, compact, not durable; medullary rays thin, hardly distinguishable; color light brown, the sap-wood lighter.

230. *Ficus brevifolia*, Nutt.

Semi-tropical Florida, — Bay Biscayne to the southern keys.

A tree sometimes 15 metres in height, with a trunk rarely exceeding 0.30 metre in diameter.

Wood light, soft, close-grained, compact, containing few large open scattered ducts, and many groups of much smaller ducts arranged in concentric circles; medullary rays numerous, thin, conspicuous; color light brown or yellow, the sap-wood lighter.

231. *Ficus pedunculata*, Ait.

Wild Fig. India-rubber Tree.

Semi-tropical Florida, — Bay Biscayne to the southern keys; in the West Indies.

A tree sometimes 12 metres in height, with a trunk rarely exceeding 0.50 metre in diameter; often branched from the ground; rare.

Wood light, soft, weak, close-grained, compact, containing many large open scattered ducts, with many groups of small ducts arranged in con-

centric circles; medullary rays numerous, obscure; color light orange brown, the sap-wood undistinguishable.

232. *Morus rubra*, L.

Red Mulberry.

Western New England and Long Island, New York, west through southern Ontario and central Michigan to the Black Hills of Dakota, eastern Nebraska and Kansas; south to Bay Biscayne and Cape Romano, Florida, and the valley of the Colorado River, Texas.

A large tree, 18 to 20 metres in height, with a trunk 0.90 to 1.20 metres in diameter; generally on rich bottom-lands; most common and reaching its greatest development in the basins of the lower Ohio and the Mississippi Rivers.

Wood light, soft, not strong, rather tough, coarse-grained, compact, very durable in contact with the soil, satiny, susceptible of a good polish; layers of annual growth clearly marked by several rows of large open ducts; medullary rays numerous, thin; color light orange-yellow, the sap-wood lighter; largely used in fencing, cooperage, for snaths, and at the South in ship and boat building.

The large dark purple fruit sweet and edible.

233. *Morus microphylla*, Buckley.

Mexican Mulberry.

Valley of the Colorado River, through western Texas to the valley of the Gila River, New Mexico; in northern Mexico.

A small tree, sometimes 7 metres in height, with a trunk rarely 0.30 metre in diameter, or often reduced to a low shrub; most common and reaching its greatest development in the mountain cañons of southern New Mexico.

Wood heavy, hard, close-grained, compact; layers of annual growth marked by several rows of small open ducts; medullary rays numerous, thin; color orange or, rarely, dark brown, the sap-wood light yellow.

The small acid fruit hardly edible.

234. *Maclura aurantiaca*, Nutt.

Osage Orange. Bois d'Arc.

Southwestern Arkansas, southeastern portions of the Indian Territory, and southward into northern Texas.

A tree sometimes 15 to 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; rich bottom-lands; most common and reaching its greatest development along the valley of the Red River in the Indian Territory; extensively planted for hedges, especially in the Western States.

Wood heavy, exceedingly hard, very strong, flexible, close-grained, compact, very durable in contact with the ground, satiny, susceptible of a beautiful polish, containing numerous small open ducts; layers of annual growth clearly marked with broad bands of larger ducts; medullary rays thin, numerous, conspicuous; color bright orange, turning brown with exposure, the sap-wood light yellow; largely used for fence-posts, paving-blocks, railway-ties, and wheel-stock.

PLATANACEÆ.

235. *Platanus occidentalis*, L.

Sycamore. Buttonwood. Button-ball Tree. Water Beech.

Southern Maine and southeastern New Hampshire to northern Vermont and the northern shores of Lakes Ontario and Erie, west to eastern Nebraska and Kansas; south to northern Florida, central Alabama, and Mississippi, and southwest to the valley of the Devil's River, Texas.

The largest tree of the Atlantic forests, often 30 to 40 metres in height, with a trunk 2.40 to 4.20 metres in diameter; borders of streams and bottom-lands, in rich, moist soil; very common and reaching its greatest development in the valleys of the Ohio and Mississippi Rivers; the large specimens generally hollow.

Wood heavy, hard, not strong, very close-grained, compact, difficult to split and work; layers of annual growth clearly marked by broad bands of small ducts; the numerous medullary rays very conspicuous, as in that of all the North American species; color brown tinged with red, the sap-wood lighter; largely used for tobacco boxes, ox-yokes, butchers' blocks, and, rarely, in the manufacture of cheap furniture.

236. *Platanus racemosa*, Nutt.

Sycamore. Buttonwood.

California, — valley of the Sacramento River, south through the interior valleys and Coast Ranges to the southern boundary of the State.

A large tree, 24 to 30 metres in height, with a trunk 0.90 to 1.20 metres in diameter; borders of streams, in rich soil.

Wood light, soft, not strong, very close-grained, compact, difficult to split; layers of annual growth clearly marked by narrow bands of small ducts; medullary rays numerous, conspicuous; color light brown tinged with red, the sap-wood lighter.

237. *Platanus Wrightii*, Watson.

Sycamore.

Valleys of southwestern New Mexico to the valley of the San Pedro River, Arizona; in northern Mexico.

A tree sometimes 15 to 18 metres in height, with a trunk 0.45 to 0.60 metre in diameter; banks of streams and high mountain cañons.

Wood light, soft, weak, very close-grained, compact; layers of annual growth clearly marked by several rows of open ducts; medullary rays numerous, thin, very conspicuous; color light brown tinged with red, the sap-wood lighter.

JUGLANDACEÆ.

238. *Juglans cinerea*, L.

Butternut. White Walnut.

Southern New Brunswick, valley of the Saint Lawrence River, Ontario and southern Michigan to northern Minnesota and central Iowa; south to Delaware, and along the Alleghany Mountains to northern Georgia, central Alabama and Mississippi, northern Arkansas, and south-eastern Kansas.

A tree 18 to 24 or, exceptionally, 30 to 35 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich woodlands; rare at the south; most common and reaching its greatest development in the Ohio River basin.

Wood light, soft, not strong, rather coarse-grained, compact, easily worked, satiny, susceptible of a beautiful polish, containing numerous regularly distributed large open ducts; medullary rays distant, thin, obscure; color bright light brown, turning dark with exposure, the sap-wood lighter; largely used for interior finish, cabinet work, etc.

The inner bark, especially that of the root, is employed medicinally as a mild cathartic, and furnishes a yellow dye.

239. *Juglans nigra*, L.

Black Walnut.

Western Massachusetts, west along the southern shores of Lake Erie through southern Michigan to southern Minnesota, eastern Nebraska, and eastern Kansas, south to western Florida, central Alabama and Mississippi, and the valley of the San Antonio River, Texas.

A large tree, often 30 to 45 metres in height, with a trunk 1.80 to 3 metres in diameter; rich bottom-lands and hillsides; most common and reaching its greatest development on the western slopes of the southern Alleghany Mountains and in the rich bottoms of southwestern Arkansas and the Indian Territory; less common east of the Alleghany Mountains, and now everywhere scarce.

Wood heavy, hard, strong, rather coarse-grained, liable to check if not carefully seasoned, easily worked, susceptible of a beautiful polish, durable in contact with the soil, containing numerous large regularly distributed open ducts; medullary rays numerous, thin, not conspicuous; color rich

dark brown, the thin sap-wood much lighter; more generally used in cabinet-making, interior finish, and for gun-stocks, than that of any other North American tree.

240. *Juglans rupestris*, Engelm.

Walnut.

Valley of the upper Colorado River, west through western Texas, southern New Mexico and Arizona, between 5,000 and 7,000 feet elevation, and in the California Coast Ranges from the San Bernardino Mountains to San Francisco Bay and the valley of the Sacramento River.

A tree rarely 15 to 22 metres in height, with a trunk 0.30 to 0.90 metre in diameter, reaching its greatest development near its northern limits in California; in Texas generally reduced to a low, much-branched shrub; borders of streams and mountain cañons, in rich soil.

Wood heavy, hard, not strong, coarse-grained, checking in drying, susceptible of a good polish, containing numerous regularly distributed large open ducts; medullary rays distant, thin, obscure; color rich dark brown, the sap-wood lighter.

The small nuts sweet and edible.

241. *Carya olivæformis*, Nutt.

Pecan. Illinois Nut.

Southeastern Iowa, southern Illinois and Indiana, northwestern Kentucky, south and southwest through Missouri and Arkansas to eastern Kansas, the Indian Territory, western Louisiana, and Texas to the valley of the Concho River.

A tree 30 to 52 metres in height, with a trunk 0.90 to 1.80 metres in diameter; borders of streams, in low, rich soil; very common and reaching its greatest development on the bottom-lands of Arkansas and the Indian Territory; the largest species of the genus, and the largest and most important tree of western Texas.

Wood heavy, hard, not strong, brittle, close-grained, compact; layers of annual growth marked by one or two rows of large open ducts; medullary rays numerous, thin; color light brown tinged with red; the sap-wood lighter brown; less valuable than the wood of the other species, and hardly used except for fuel.

The sweet edible nuts are collected in great quantities, affording an important article of commerce.

242. *Carya alba*, Nutt.

Shell-bark Hickory. Shag-bark Hickory.

Valley of the Saint Lawrence River, northern shores of Lakes Ontario and Erie to southern Michigan and southeastern Minnesota, south to western Florida, central Alabama and Mississippi, and west to eastern Kansas, the Indian Territory, and eastern Texas.

A large tree, 24 to 30 or, exceptionally, 39 to 45 metres in height, with a trunk 0.90 to 1.20 metres in diameter; rich hillsides and sandy ridges; common, and reaching its greatest development west of the Alleghany Mountains; varying greatly in the size and shape of the fruit. A form with small, thin-shelled nuts (*C. microcarpa*, Nutt.) is not rare from Delaware southward, and in Michigan.

Wood heavy, very hard and strong, tough, close-grained, compact, flexible; layers of annual growth clearly marked with one to three rows of large open ducts; medullary rays numerous, thin; color brown, the thin and more valuable sap-wood nearly white; largely used in the manufacture of agricultural implements, carriages, axe-handles, baskets, etc.

The sweet and edible nuts afford an important article of commerce.

243. *Carya sulcata*, Nutt.

Big Shell-bark. Bottom Shell-bark.

Chester County, Pennsylvania, west to southern Indiana and Illinois, eastern Kansas, and the Indian Territory.

A tree 24 to 30 or, exceptionally, 37 metres in height, with a trunk 0.60 to 1.20 metres in diameter; bottom-lands, in low, rich soil; rare and local; most common and reaching its greatest development in southern Arkansas and the Indian Territory.

Wood heavy, very hard, strong and tough, very close-grained, compact, flexible; layers of annual growth marked by one or two rows of large open ducts; medullary rays numerous, obscure; color dark brown, the sap-wood nearly white; used for the same purposes as that of the shell-bark hickory.

The large nuts sweet and edible.

244. *Carya tomentosa*, Nutt.

Mocker-nut. Black Hickory. Bull-nut. Big-bud Hickory. White-heart Hickory. King nut.

Valley of the Saint Lawrence River, northern shores of Lakes Ontario and Erie to eastern Nebraska, eastern Kansas, and the Indian Territory, south to Cape Canaveral and Tampa Bay, Florida, and the valley of the Brazos River, Texas.

A tree 24 to 33 metres in height, with a trunk 0.90 to 1.20 metres in diameter; generally on rich hillsides; less commonly on low, river bottom-lands; very common in the Gulf States, and the most generally distributed species of the genus in the South.

Wood heavy, very hard, strong, tough, very close-grained, checking in drying, flexible, containing few large regularly distributed open ducts; medullary rays numerous, thin, obscure; color rich dark brown, the thick sap-wood nearly white; used for the same purposes as that of the shell-bark hickory.

245. Carya porcina, Nutt.

Pig-nut. Brown Hickory. Black Hickory. Switch-bud Hickory.

Southern Maine to southern Ontario, southern Michigan and Minnesota to eastern Nebraska, eastern Kansas, and the Indian Territory, south to Cape Canaveral and Pease Creek, Florida, and the valley of the Nueces River, Texas.

A tree 24 to 40 metres in height, with a trunk 0.90 to 1.50 metres in diameter; dry hills and uplands; common.

Wood heavy, hard, very strong and tough, flexible, close-grained, checking in drying, containing many large open ducts; color dark or light brown, the thick sap-wood lighter, often nearly white; used for the same purposes as that of the shell-bark hickory.

246. Carya amara, Nutt.

Bitter-nut. Swamp Hickory.

Southern Maine to the valley of the Saint Lawrence River, west through Ontario, central Michigan and Minnesota to eastern Nebraska, eastern Kansas, and the Indian Territory, south to western Florida and the valley of the Trinity River, Texas.

A tree 18 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of streams and swamps, in low ground, or often on dry, rich uplands.

Wood heavy, very hard, strong, tough, close-grained, checking in drying; layers of annual growth marked by several rows of large open ducts; medullary rays numerous, obscure; color dark brown, the thick sap-wood light brown, or often nearly white; largely used for hoops, ox-yokes, etc.

247. Carya myristicæformis, Nutt.

Nutmeg Hickory.

South Carolina, near the coast; Arkansas, from the Arkansas River to the Red River Valley.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; sandy ridges, borders of streams and swamps; rare and very local in South Carolina; more common and reaching its greatest development in southern Arkansas.

Wood heavy, hard, very strong and tough, close-grained, compact, containing numerous small open ducts; layers of annual growth marked by one or two rows of larger ducts; medullary rays numerous, thin, not conspicuous; color light brown, the sap-wood lighter.

248. Carya aquatica, Nutt.

Water Hickory. Swamp Hickory. Bitter Pecan.

North Carolina, south near the coast to Cape Malabar and the Caloosa River, Florida (in Florida not detected within 8 to 10 miles of the coast),

through the Gulf States to western Louisiana, northeastern Arkansas, and the valley of the Brazos River, Texas.

A tree 18 to 21 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or generally much smaller; low river swamps; most common and reaching its greatest development on the bottom-lands of the lower Mississippi and Yazoo Rivers.

Wood heavy, soft, strong, rather brittle, very close-grained, compact, containing few scattered open ducts; layers of annual growth less clearly marked than in the other species of the genus; medullary rays numerous, thin; color dark brown, the sap-wood light, often nearly white; used for fencing, fuel, etc.

MYRICACEÆ.

249. *Myrica cerifera*, L.

Bayberry. Wax Myrtle.

Shores of Lake Erie; coast of Maine, and south near the coast to the Florida keys and southern Alabama.

A tree sometimes 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or, except in the Southern States, a low much-branched shrub; usually on sandy beaches and dry hillsides, reaching its greatest development on the bottoms and rich hummocks of the Georgia and Florida coasts.

Wood light, soft, strong, brittle, very close-grained, compact; medullary rays numerous, thin; color dark brown, the sap-wood lighter.

The leaves and stimulant and astringent bark of the roots are sometimes employed by herbalists. The wax which covers the small globular fruit was formerly largely collected and made into candles, and now, under the name of myrtle wax, is a popular remedy in the treatment of dysentery.

250. *Myrica Californica*, Cham.

Cape Foulweather, Oregon, south near the coast to the Bay of Monterey, California.

A small evergreen tree, rarely exceeding 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or toward its northern limits reduced to a low shrub; sandy beaches and gravelly hillsides.

Wood heavy, very hard, strong, brittle, very close-grained, compact; medullary rays numerous, thin, conspicuous; color light rose, the sap-wood lighter.

CUPULIFERÆ.

251. *Quercus alba*, L.

White Oak.

Northern Maine, valley of the Saint Lawrence River, Ontario, lower peninsula of Michigan to southeastern Minnesota, south to the Saint

John's River and Tampa Bay, Florida, west to western Missouri, western Arkansas, and the valley of the Brazos River, Texas.

A large tree, 24 to 45 metres in height, with a trunk 1.20 to 2.40 metres in diameter; all soils; very common, and reaching its greatest development along the western slopes of the Alleghany Mountains and in the valley of the Ohio River and its tributaries, where it often forms a large portion of the forest growth.

Wood strong, very heavy, hard, tough, close-grained, liable to check unless carefully seasoned, durable in contact with the soil; layers of annual growth strongly marked by several rows of large open ducts; medullary rays broad, prominent; color brown, the sap-wood lighter brown; largely used in ship-building, construction of all sorts, cooperage, in the manufacture of carriages, agricultural implements, and baskets, and for railway-ties, fencing, interior finish, cabinet-making, fuel, etc.

252. *Quercus lobata*, Née.

White Oak. Weeping Oak.

California west of the Sierra Nevadas, from the valley of the upper Sacramento River, south through the foot-hills and interior valleys to the San Bernardino Mountains.

The largest of the Pacific oaks, often 30 metres in height, with a trunk 0.90 to 2.40 metres in diameter; very common through the central part of the State.

Wood moderately hard, fine-grained, compact; layers of annual growth marked by a few large open ducts and containing few smaller ducts arranged in lines parallel to the broad conspicuous medullary rays; color light brown, the sap-wood lighter; considered of little economic value, and only used for fuel.

253. *Quercus Garryana*, Doug.

White Oak.

Vancouver's Island, shores of Puget Sound, south through western Washington, Oregon, and California to San Francisco Bay; in Washington and Oregon extending to the eastern slopes of the Cascade Mountains.

A tree 21 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or at high elevations reduced to a low shrub; dry, gravelly soil; common.

Wood strong, hard, that of the young trees tough, close-grained, compact; layers of annual growth marked by one to three rows of open ducts; medullary rays, varying greatly in width, often conspicuous; color light brown or yellow, the sap-wood lighter, often nearly white; somewhat used for carriage and cooperage stock, in cabinet-making, ship-building, and very largely for fuel; the best substitute for Eastern white oak produced in the Pacific forests.

254. *Quercus obtusiloba*, Michx.

Post Oak. Iron Oak.

Martha's Vineyard, Massachusetts, south to northern Florida, west through southern Ontario and Michigan to eastern Nebraska, eastern Kansas, and the Indian Territory, reaching the one hundredth meridian in central Texas.

A tree rarely exceeding 24 metres in height, with a trunk 0.90 to 1.50 metres in diameter, or on the Florida coast reduced to a low shrub (var. *parvifolia*, Chapm.) ; dry, gravelly uplands, clay barrens, or in the Southwest on Cretaceous formations ; the most common and widely distributed oak of the Gulf States west of the Mississippi River.

Wood heavy, hard, close-grained, compact, checking badly in drying, very durable in contact with the soil ; layers of annual growth marked by one to three rows of not large open ducts ; medullary rays numerous, conspicuous ; color dark or light brown, the sap-wood lighter ; largely used, especially in the Southwest, for fencing, railway-ties, and fuel, and somewhat for carriage stock, cooperage, construction, etc.

255. *Quercus undulata*, var. *Gambelii*, Engelm.

Scrub Oak.

Mountain region of western Texas and New Mexico to the Santa Catalina and San Francisco Mountains, Arizona, eastern slopes of the Rocky Mountains of Colorado north to the valley of the Platte River, and on the Wahsatch Mountains of Utah.

A small tree, rarely 15 metres in height, with a trunk sometimes 0.60 metre in diameter, or often a low shrub spreading from underground shoots and forming dense thickets, reaching its greatest development on the high mountains of southern New Mexico and Arizona ; the large specimens generally hollow and defective.

Wood heavy, hard, strong, that of young trees quite tough, close-grained, checking badly in drying ; layers of annual growth marked by few not large open ducts ; medullary rays numerous, conspicuous ; color rich dark brown, the sap-wood lighter ; largely used for fuel ; and in Utah the bark in tanning.

The typical *Q. undulata*, Torr., of the central Rocky Mountain region does not attain arborescent size and habit.

256. *Quercus macrocarpa*, Michx.

Bur Oak. Mossy-cup Oak. Over-cup Oak.

Nova Scotia, New Brunswick, northern shores of Lake Huron to Lake Winnipeg, south to the valley of the Penobscot River, Maine, and along the shores of Lake Champlain and the valley of the Ware River, Massachusetts, to Lancaster County, Pennsylvania, west to the eastern foot-hills of the Rocky Mountains of Montana, central Nebraska and Kansas, southwest to the Indian Territory and the valley of the Nueces River, Texas.

A large tree of the first economic value, 24 to 50 metres in height, with a trunk 1.20 to 2.10 metres in diameter; rich bottoms and prairies; in the prairie region the principal growth of the "oak openings," and extending farther west and northwest than any oak of the Atlantic forests.

Wood heavy, strong, hard, tough, close-grained, compact, more durable in contact with the soil than that of other American oaks; layers of annual growth marked by one to three rows of small open ducts; medullary rays often broad and conspicuous; color dark or rich light brown, the sap-wood much lighter; generally confounded with white oak (*Q. alba*), and employed for the same purposes.

257. *Quercus lyrata*, Walt.

Over-cup Oak. Swamp Post Oak. Water White Oak.

North Carolina, south near the coast to western Florida, west through Alabama, Mississippi, and Louisiana to the valley of the Trinity River, Texas, and through Arkansas and southeastern Missouri to middle Tennessee, southern Indiana and Illinois.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; deep, often submerged river-swamps; rare in the Atlantic States; more common and reaching its greatest development in the valley of the Red River, in Arkansas and Texas.

Wood heavy, hard, strong, tough, very durable in contact with the ground, close-grained, inclined to check in drying; layers of annual growth marked by one to three rows of large open ducts; medullary rays broad, numerous, conspicuous; color rich dark brown, the sap-wood much lighter; used for the same purposes as that of the white oak (*Q. alba*).

258. *Quercus bicolor*, Willd.

Swamp White Oak.

Southern Maine, valley of the upper Saint Lawrence River, Ontario, southern peninsula of Michigan to southeastern Iowa and western Missouri, south to Delaware, and along the Alleghany Mountains to northern Georgia, northern Kentucky, and northern Arkansas.

A large tree, 24 to 36 metres in height, with a trunk 1.20 to 3 metres in diameter; borders of streams and swamps, in deep alluvial soil; common and reaching its greatest development in the region south of the great lakes.

Wood heavy, hard, strong, tough, close-grained, inclined to check in seasoning; layers of annual growth marked by one to three rows of large open ducts; medullary rays broad, conspicuous; color light brown, the sap-wood hardly distinguishable; used for the same purposes as that of the white oak (*Q. alba*).

259. *Quercus Michauxii*, Nutt.

Basket Oak. Cow Oak.

Delaware, south through the lower and middle districts to northern Florida, through the Gulf States to the valley of the Trinity River, Texas, and through Arkansas and southeastern Missouri to central Tennessee and Kentucky, and southern Illinois and Indiana.

A tree 24 to 36 metres in height, with a trunk 1.20 to 2.10 metres in diameter; borders of streams and deep, often submerged swamps; the common and most valuable white oak of the Gulf States, reaching its greatest development on the rich bottom-lands of southeastern Arkansas and Louisiana.

Wood heavy, hard, very strong, tough, close-grained, compact, very durable in contact with the soil, easily split; layers of annual growth marked by few rather large open ducts; medullary rays broad, conspicuous; color light brown, the sap-wood darker; largely used in the manufacture of agricultural implements, wheel-stock, baskets, for which it is unsurpassed, for cooperage, fencing, construction, and fuel.

The large sweet edible acorns are eagerly devoured by cattle and other animals.

260. *Quercus Prinus*, L.

Chestnut Oak. Rock Chestnut Oak.

Eastern Massachusetts, west to the shores of Lake Champlain, shores of Quinté Bay, Ontario, and the valley of the Genesee River, New York, south to Delaware, and through the Alleghany Mountain region to northern Alabama, extending west to central Kentucky and Tennessee.

A tree 24 to 30 metres in height, with a trunk 0.90 to 1.20 metres in diameter; rocky banks and hillsides; very common and reaching its greatest development in the southern Alleghany region, here often forming a large proportion of the forest growth.

Wood heavy, hard, strong, rather tough, close-grained, inclined to check in drying, durable in contact with the soil, containing few open ducts; medullary rays very broad, conspicuous; color dark brown, the sap-wood lighter; largely used in fencing, for railway-ties, etc.

The bark, rich in tannin, is largely used in preference to that of the other white oaks in tanning leather.

261. *Quercus prinoides*, Willd.

Yellow Oak. Chestnut Oak. Chinquapin Oak.

Eastern Massachusetts, shores of Lake Champlain, west along the northern shores of Lakes Ontario and Erie, through southern Michigan to eastern Nebraska, eastern Kansas, and the Indian Territory; south to Delaware and through the Alleghany region to northern Alabama and Mississippi, extending southwest to the Guadalupe Mountains, Texas.

A tree 24 to 39 metres in height, with a trunk 0.60 to 0.90 metre in diameter (*Q. Muhlenbergii*), or often, especially toward the eastern and western limits of its range, reduced to a low, slender shrub (*Q. prinoides*; *Q. Prinus*, var. *humilis*, Marsh.; *Q. Prinus*, var. *Chincapin*, Michx. f.); dry hillsides and low, rich bottoms; rare, except as a shrub, east of the Alleghany Mountains; very common in the Mississippi River basin, and reaching its greatest development in southern Arkansas.

Wood heavy, hard, very strong, close-grained, checking badly in drying, very durable in contact with the soil; layers of annual growth marked by rows of small open ducts; medullary rays broad, conspicuous; color dark brown, the sap-wood much lighter; used for cooperage, wheel-stock, fencing, railway-ties, etc.

The small acorns sweet and edible.

262. Quercus Douglasii, Hook. & Arn.

Mountain White Oak. Blue Oak.

California, — from about latitude 39°, south along the western foot-hills of the Sierra Nevadas below 4,000 feet elevation, and through the Coast Ranges to the San Gabriel Mountains.

A tree 18 to 24 metres in height, with a trunk 0.60 to 1.20 metres in diameter; common on the low foot-hills of the Sierras.

Wood very hard, heavy, strong, brittle, inclined to check in drying; layers of annual growth marked by several rows of small open ducts, and containing many scattered groups of smaller ducts; medullary rays numerous, varying greatly in width; color dark brown, becoming nearly black with exposure, the thick sap-wood light brown.

263. Quercus oblongifolia, Torr.

White Oak.

California, — foot-hills of the San Gabriel Mountains to San Diego County; foot-hills of the mountain ranges of southern Arizona and New Mexico; in northern Mexico.

A small evergreen tree, 12 to 15 metres in height, with a trunk 0.45 to 0.60 metre in diameter; the large specimens generally hollow and defective.

Wood very heavy, hard, strong, brittle, very close-grained, checking badly in drying; layers of annual growth hardly distinguishable, containing few small open ducts arranged in many groups parallel to the broad and very conspicuous medullary rays; color very dark brown or almost black, the thick sap-wood brown; of little economic value except as fuel.

264. Quercus grisea, Liebm.

White Oak.

Southern Colorado, mountains of western Texas, southern New Mexico and Arizona between 5,000 and 10,000 feet elevation, west to the Colorado desert of California; in northern Mexico.

A tree 15 to 24 metres in height, with a trunk rarely exceeding 0.60 metre in diameter, or reduced to a low, much-branched shrub; a polymorphous species, varying greatly in habit and in the shape and texture of the leaves, but apparently well characterized by its connate cotyledons; the large specimens generally hollow and defective.

Wood very heavy, strong, hard, close-grained, checking badly in drying; layers of annual growth marked by one or two rows of small open ducts, these connected by rows of similar ducts parallel to the numerous conspicuous medullary rays; color very dark brown, the thick sap-wood much lighter.

265. *Quercus reticulata*, Humb. & Bonp.

Southeastern Arizona, — San Francisco, and Santa Rita Mountains between 7,000 and 10,000 feet elevation; in northern Mexico.

A small tree, 9 to 12 metres in height, with a trunk 0.30 to 0.45 metre in diameter; dry, gravelly slopes.

Wood very heavy, hard, close-grained, checking badly in drying, containing many small scattered open ducts; medullary rays numerous, very broad; color dark brown, the sap-wood lighter.

266. *Quercus Durandii*, Buckley.

Central Alabama; western and southern Texas.

A tree 21 to 24 metres in height, with a trunk 0.60 to 1.20 metres in diameter; rich bottom-lands, or dry slopes and limestone hills, then reduced to a low shrub forming dense, impenetrable thickets of great extent (*Q. San-Sabeana*); very rare and local in Alabama; the common and most valuable white oak of western Texas.

Wood very heavy and hard, strong, brittle, close-grained, inclined to check in drying; layers of annual growth marked by few large open ducts; medullary rays numerous, conspicuous; color brown, the sap-wood lighter; used for the same purposes as that of the white oak (*Q. alba*).

267. *Quercus virens*, Ait.

Live Oak.

Southern Virginia, south along the coast to Bay Biscayne and Cape Romano, Florida, along the Gulf Coast to Mexico, extending through western Texas to the valley of the Red River, the Apache and Guadalupe Mountains, and the mountains of northern Mexico south of the Rio Grande, here between 6,000 and 8,000 feet elevation; in Costa Rica.

An evergreen tree, 15 to 18 metres in height, with a trunk 1.50 to 2.10 metres in diameter, or in the interior of Texas much smaller and often shrubby; on the coast, on rich hummocks and ridges, a few feet above water-level; common and reaching its greatest development in the south Atlantic States.

Wood very heavy, hard, strong, tough, very close-grained, compact, difficult to work, susceptible of a beautiful polish; layers of annual growth obscure, often hardly distinguishable, containing many small open ducts arranged in short broken rows parallel to the broad conspicuous medullary rays; color light brown or yellow, the sap-wood nearly white; formerly very largely and now occasionally used in ship-building.

268. *Quercus chrysolepis*, Liebm.

Live Oak. Maul Oak. Valparaiso Oak.

Southwestern Oregon, south through the California Coast Ranges and along the western slopes of the Sierra Nevada and San Bernardino Mountains between 3,000 and 8,000 feet elevation, and south into Lower California; southeastern Arizona, San Francisco and Santa Catalina Mountains.

An evergreen tree, 18 to 27 metres in height, with a trunk sometimes 1.50 metres in diameter, or at high elevations reduced to a low narrow-leaved shrub (var. *vaccinifolia*, Engelm.).

Wood heavy, very strong and hard, tough, close-grained, compact, difficult to work, containing many rather small open ducts arranged in wide bands parallel to the broad conspicuous medullary rays; color light brown, the sap-wood darker; somewhat used in the manufacture of agricultural implements, wagons, etc.; the most valuable oak of the Pacific forests.

269. *Quercus Emoryi*, Torr.

Black Oak.

Western Texas, and through the mountain ranges of southern New Mexico and eastern and southern Arizona.

A tree 12 to 15 metres in height, with a trunk 0.30 to 0.90 metre in diameter, or toward its eastern limits in Texas reduced to a low shrub; common and reaching its greatest development in southwestern New Mexico and southern Arizona near streams in open cañons between 5,000 and 7,000 feet elevation; dry, gravelly soil, the large specimens hollow and defective.

Wood very heavy, not hard, strong, brittle, close-grained, compact; layers of annual growth marked by several rows of small open ducts, these connected by narrow groups of similar ducts parallel to the broad conspicuous medullary rays; color dark brown or almost black, the thick sap-wood bright brown tinged with red.

270. *Quercus agrifolia*, Née.

Coast Live Oak. Enceno.

California, — Mendocino County, south through the valleys of the Coast Ranges to Lower California.

A large evergreen tree, 24 to 30 metres in height, with a trunk 1.20 to 2.10 metres in diameter, or, rarely, reduced to a low shrub (var *frutescens*, Engelm.); rare at the North; common south of San Francisco Bay, and the largest and most generally distributed oak in the extreme south-western part of the State; dry slopes and ridges.

Wood heavy, hard, strong, brittle, close-grained, compact; layers of annual growth hardly distinguishable, containing many large open ducts arranged in several rows parallel to the broad conspicuous medullary rays; color light brown or red, the sap-wood darker brown; of little value except as fuel.

271. *Quercus Wislizeni*, A. DC.

Live Oak.

California, — Mount Shasta region, south along the western slopes of the Sierra Nevadas to Tulare County, and in the Coast Ranges south to the Santa Lucia Mountains.

An evergreen tree, 15 to 18 metres in height, with a trunk 0.90 to 1.80 metres in diameter, or toward its northeastern limits reduced to a low shrub (var. *frutescens*, Engelm.); not common.

Wood heavy, very hard, strong, close-grained, compact, containing numerous large open ducts arranged in irregular bands parallel to the broad conspicuous medullary rays; color light brown tinged with red, the sap-wood lighter.

272. *Quercus rubra*, L.

Red Oak. Black Oak.

Nova Scotia, southern New Brunswick to eastern Minnesota, western Iowa, eastern Kansas, and the Indian Territory; south to northern Florida, southern Alabama and Mississippi, and the Limpia Mountains, western Texas.

A large tree, 30 to 45 metres in height, with a trunk 1.20 to 2.10 metres in diameter; very common in all soils and extending farther north than any other Atlantic oak. The form of western Texas, with smaller acorns and deeper cups, and more deeply divided leaves, the wood heavier, harder, and more compact, is var. *Texana*, Buckley.

Wood heavy, hard, strong, coarse-grained, inclined to check in drying; layers of annual growth marked by several rows of very large open ducts; medullary rays few, conspicuous; color light brown or red, the sap-wood somewhat darker; now largely used for clapboards, cooperage, and somewhat for interior finish, in the manufacture of chairs, etc.

273. *Quercus coccinea*, Wang.

Scarlet Oak.

Southern Maine to northern New York, Ontario, northern Michigan and Minnesota, eastern Iowa and northeastern Missouri, south to Delaware

and southern Tennessee, and through the Alleghany region to northern Florida.

A tree 30 to 54 metres in height, with a trunk rarely exceeding 0.60 to 1.20 metres in diameter; at the East, in dry, sandy soil or, less commonly, in rich, deep loam; in the Northwest, with *Q. macrocarpa*, forming the oak-opening growth; not common, and reaching its greatest development in the basin of the lower Ohio River.

Wood heavy, hard, strong, coarse-grained; layers of annual growth strongly marked by several rows of large open ducts; medullary rays thin, conspicuous; color light brown or red, the sap-wood rather darker; if used at all, confounded with that of *Q. rubra*.

274. Quercus tinctoria, Bartram.

Black Oak. Yellow-bark Oak. Quercitron Oak. Yellow Oak.

Southern Maine to northern Vermont, Ontario and southern Minnesota, eastern Nebraska, eastern Kansas, and the Indian Territory, south to western Florida, southern Alabama and Mississippi, and eastern Texas.

A large tree, 36 to 48 metres in height, with a trunk 0.90 to 1.80 metres in diameter; generally on dry or gravelly uplands; very common.

Wood heavy, hard, strong, not tough, coarse-grained, liable to check in drying; layers of annual growth marked by several rows of very large open ducts; color bright brown tinged with red, the sap-wood much lighter; somewhat used in cooperage and for construction, etc.

The bark largely used in tanning; the intensely bitter inner bark yields a valuable yellow dye, and is occasionally used medicinally in the form of decoctions, etc., in the treatment of hemorrhage.

275. Quercus Kelloggii, Newberry.

Black Oak.

Valley of the Mackenzie River, Oregon, south through the Coast Ranges and along the western slopes of the Sierra Nevada and San Bernardino Mountains to the southern borders of California.

A large tree, 18 to 24 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or at high elevations reduced to a shrub; the most common and important oak of the valleys of southwestern Oregon and the California Sierras.

Wood heavy, hard, strong, very brittle, close-grained, compact; layers of annual growth marked by several rows of large open ducts; medullary rays few, broad, conspicuous; color light red, the thin sap-wood lighter; of little value, except as fuel; the bark somewhat used in tanning.

276. Quercus nigra, L.

Black Jack. Jack Oak.

Long Island, New York, west through northern Ohio and Indiana to southern Wisconsin, southern Minnesota, eastern Nebraska, eastern

Kansas, and the Indian Territory, south to Matanzas Inlet and Tampa Bay, Florida, and the valley of the Nueces River, Texas.

A small tree, sometimes 12 or even 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter, or more often much smaller; dry, barren uplands, or often on heavy clay soils; very common through the Southern States, and reaching its greatest development in southwestern Arkansas, the Indian Territory, and eastern Texas, forming, with the post oak (*Q. obtusiloba*), the growth of the Texas cross-timbers.

Wood heavy, hard, strong, checking badly in drying; layers of annual growth marked by several rows of large open ducts; medullary rays broad, conspicuous; color rather dark rich brown, the sap-wood much lighter; of little value except as fuel.

277. *Quercus falcata*, Michx.

Spanish Oak. Red Oak.

Long Island, New York, south to middle Florida, through the Gulf States to the valley of the Brazos River, Texas, and through Arkansas and southeastern Missouri to central Tennessee and Kentucky, southern Illinois and Indiana.

A large tree, 24 to 30 metres in height, with a trunk 0.90 to 1.80 metres in diameter; dry, gravelly uplands and barrens; in the North Atlantic States only near the coast, rare; most common and reaching its greatest development in the South Atlantic and Gulf States, where, in the middle districts, it is the most common forest tree.

Wood heavy, very hard and strong, not durable, coarse-grained, checking badly in drying; layers of annual growth strongly marked by several rows of large open ducts; medullary rays few, conspicuous; color light red, the sap-wood lighter; somewhat used for cooperage, construction, etc., and very largely for fuel.

The bark is rich in tannin.

278. *Quercus Catesbæi*, Michx.

Turkey Oak. Scrub Oak. Forked-leaf Black Jack. Black Jack.

North Carolina, south near the coast to Cape Malabar and Pease Creek, Florida, and along the coast of Alabama and Mississippi.

A small tree, 7 to 15 metres in height, with a trunk 0.45 to 0.60 metre in diameter; very common in the South Atlantic and east Gulf States upon barren sandy hills and ridges of the maritime pine-belt; rare in Mississippi.

Wood heavy, hard, strong, close-grained, compact; layers of annual growth marked by several rows of large open ducts, and containing many much smaller ducts arranged in short lines parallel to the broad conspicuous medullary rays; color light brown tinged with red, the sap-wood somewhat lighter; largely used for fuel.

279. *Quercus palustris*, Du Roi.

Pin Oak. Swamp Spanish Oak. Water Oak.

Valley of the Connecticut River, Massachusetts, to central New York, south to Delaware and the District of Columbia; southern Wisconsin to eastern Kansas, southern Arkansas, and southeastern Tennessee.

A tree 24 to 30 or, exceptionally, 36 metres in height, with a trunk 0.90 to 1.50 metres in diameter; low, rich soil, generally along the borders of streams and swamps; most common and reaching its greatest development west of the Alleghany Mountains.

Wood heavy, hard, very strong, coarse-grained, inclined to check badly in drying; layers of annual growth marked by several rows of large open ducts; medullary rays broad, numerous, conspicuous; color light brown, the sap-wood rather darker; somewhat used for shingles, clapboards, construction, and in cooepage.

280. *Quercus aquatica*, Walt.

Water Oak. Duck Oak. Possum Oak. Punk Oak.

Southern Delaware, south through the coast and middle districts to Cape Malabar and Tampa Bay, Florida; through the Gulf States to the valley of the Colorado River, Texas, and through Arkansas to south-eastern Missouri, middle Kentucky and Tennessee.

A tree 15 to 24 metres in height, with a trunk 0.60 to 1.20 metres in diameter; generally along streams and bottoms, in heavy, undrained soil, or, more rarely, upon uplands; very common and reaching its greatest development near the larger streams of the maritime pine-belt in the eastern Gulf States.

Wood heavy, hard, strong, coarse-grained, compact; layers of annual growth marked by several rows of large open ducts; medullary rays thin, conspicuous; color rather light brown, the sap-wood lighter; probably not used except as fuel.

281. *Quercus laurifolia*, Michx.

Laurel Oak.

North Carolina, south near the coast to Mosquito Inlet and Cape Romano, Florida, and along the Gulf coast to the shores of Mobile Bay.

A large tree, 18 to 24 metres in height, with a trunk 0.90 to 1.20 metres in diameter; most common and reaching its greatest development on the rich hummocks of the Florida coast.

Wood heavy, very strong and hard, coarse-grained, inclined to check in drying; layers of annual growth marked by several rows of rather small open ducts; medullary rays broad, conspicuous; color dark brown tinged with red, the sap-wood lighter.

282. *Quercus heterophylla*, Michx. f.

Bartram's Oak.

Salem and Cumberland Counties, New Jersey ; North Carolina (*M. A. Curtis*) ; and doubtfully from North Carolina and eastern Texas.

A small tree, 12 to 15 metres in height, with a trunk 0.45 to 0.60 metre in diameter ; rare and very local, and often considered a natural hybrid.

Wood heavy, hard, very strong, close-grained, compact ; layers of annual growth marked by several rows of small open ducts ; medullary rays numerous, conspicuous ; color light brown tinged with red, the sap-wood somewhat darker.

283. *Quercus cinerea*, Michx.

Upland Willow Oak. Blue Jack. Sand Jack.

North Carolina, south near the coast to Cape Malabar and Pease Creek, Florida, west along the Gulf coast to the valley of the Brazos River, Texas, extending north through eastern Texas to about latitude 33°.

A tree 9 to 15 metres in height, with a trunk rarely exceeding 0.20 metre in diameter ; sandy barrens and dry upland ridges.

Wood heavy, hard, strong, close-grained, compact ; layers of annual growth marked by several rows of not large open ducts ; medullary rays distant, thin, conspicuous ; color light brown tinged with red, the sap-wood darker.

284. *Quercus hypoleuca*, Engelm.

Limpia Mountains, Texas, valleys of the high mountain ranges of southwestern New Mexico, Santa Rita Mountains, Arizona, above 6,000 feet elevation ; in Sonora.

A small evergreen tree, 9 to 15 metres in height, with a trunk sometimes 0.75 metre in diameter ; dry, gravelly slopes and summits, the large specimens hollow and defective.

Wood heavy, very strong and hard, close-grained, compact ; layers of annual growth marked by few small open ducts ; medullary rays broad, conspicuous ; color dark brown, the sap-wood much lighter.

285. *Quercus imbricaria*, Michx.

Shingle Oak. Laurel Oak.

Eastern Pennsylvania, west through southern Michigan, southern Wisconsin, and southeastern Iowa to southeastern Nebraska and northeastern Kansas, south to northern Georgia and Alabama, middle Tennessee, and northern Arkansas.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter ; rich woodlands.

Wood heavy, hard, rather coarse-grained, checking badly in drying ; layers of annual growth marked by many rows of large open ducts ;

medullary rays broad, conspicuous; color light brown tinged with red, the sap-wood much lighter; occasionally used for clapboards, shingles, etc.

286. Quercus Phellos, L.

Willow Oak. Peach Oak.

Staten Island, New York, south near the coast to northeastern Florida, through the Gulf States to the valley of the Sabine River, Texas, and through Arkansas to southeastern Missouri, Tennessee, and southern Kentucky.

A tree 18 to 24 metres in height, with a trunk sometimes 0.90 metre in diameter; bottom-lands or rich sandy uplands.

Wood heavy, strong, not hard, rather close-grained, compact; layers of annual growth marked by several rows of small open ducts; medullary rays few, distant; color light brown tinged with red, the sap-wood lighter red; somewhat used for felloes of wheels, clapboards, in construction, etc.

287. Quercus densiflora, Hook. & Arn.

Tan-bark Oak. Chestnut Oak. Peach Oak.

Southwestern Oregon, south through the Coast Ranges to the Santa Lucia Mountains, California.

A tree 18 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich valleys and banks of streams; most common and reaching its greatest development in the redwood forests of the California coast.

Wood heavy, hard, strong, very close-grained, compact, containing broad bands of small open ducts parallel to the thin dark conspicuous medullary rays; color bright reddish-brown, the thick sap-wood darker brown; largely used as fuel.

The bark, rich in tannin, is very largely used, and preferred to that of any other tree of the Pacific forests, for tanning.

288. Castanopsis chrysophylla, A. DC.

Chinquapin.

Cascade Mountains, Oregon, below 4,000 feet elevation, south along the western slopes of the Sierras, and through the California Coast Ranges to the San Bernardino and San Jacinto Mountains.

A tree 15 to 24 metres in height, with a trunk 0.30 to 0.90 metre in diameter, or at high elevations and toward its southern limits reduced to a low shrub; most common and reaching its greatest development in the Coast Range valleys of northern California; at its southern limits rarely below 10,000 feet elevation.

Wood light, soft, not strong, close-grained, compact; layers of annual growth marked by a single row of rather large open ducts; medullary rays numerous, obscure; color light brown tinged with red, the sap-wood lighter; in southern Oregon occasionally used in the manufacture of ploughs and other agricultural implements.

289. *Castanea pumila*, Mill.*Chinquapin.*

Southern Pennsylvania, and the valley of the lower Wabash River, Indiana, south and southwest to northern Florida and the valley of the Neches River, Texas.

A tree sometimes 15 metres in height, with a trunk 0.30 to 1.05 metres in diameter, or often, especially in the Atlantic States, reduced to a low shrub; rich hillsides and borders of swamps; most common and reaching its greatest development in southern Arkansas.

Wood light, hard, strong, coarse-grained, durable in contact with the ground, liable to check in drying; layers of annual growth marked by many rows of large open ducts; medullary rays numerous, obscure; color dark brown, the sap-wood hardly distinguishable; used for posts, rails, railway-ties, etc.

The small nuts sweet and edible.

290. *Castanea vulgaris*, var. *Americana*, A. DC.*Chestnut.*

Southern Maine to northern Vermont, southern Ontario and southern Michigan, south through the northern States to Delaware and southern Indiana, and along the Alleghany Mountains to northern Alabama, extending west to middle Kentucky and Tennessee.

A large tree, 24 to 30 metres in height, with a trunk 1.80 to 4 metres in diameter; rich woods and hillsides; common and reaching its greatest development on the western slopes of the southern Alleghany Mountains.

Wood light, soft, not strong, coarse-grained, liable to check and warp in drying, easily split, very durable in contact with the soil; layers of annual growth marked by many rows of large open ducts; medullary rays numerous, obscure; color brown, the sap-wood lighter; largely used in cabinet-making, for railway-ties, posts, fencing, etc.

The fruit sweet and edible.

291. *Fagus ferruginea*, Ait.*Beech.*

Nova Scotia and the valley of the Restigouche River to the northern shores of Lake Huron and northern Wisconsin, south to western Florida, west to eastern Illinois, southeastern Missouri, northeastern Arkansas, and the Trinity River, Texas.

A large tree, 24 to 34 metres in height, with a trunk 0.90 to 1.20 metres in diameter; rich woods, or at the South sometimes on bottom-lands or borders of swamps; reaching its greatest development upon the "bluff" formations of the lower Mississippi basin; very common.

Wood very hard, strong, tough, very close-grained, not durable in contact with the soil, inclined to check in drying, difficult to season,

susceptible of a beautiful polish; medullary rays broad, very conspicuous; color, varying greatly with soil and situation, dark or often very light red, the sap-wood nearly white; largely used in the manufacture of chairs, shoe-lasts, plane-stocks, handles, etc., and for fuel.

292. Ostrya Virginica, Willd.

Hop Hornbeam. Iron-wood. Lever-wood.

Bay of Chaleur, through the valleys of the Saint Lawrence and lower Ottawa Rivers, northern shore of Lake Huron to northern Minnesota, south through the Northern States and along the Alleghany Mountains to western Florida, and through eastern Iowa, southeastern Missouri, and Arkansas, to eastern Kansas, the Indian Territory, and eastern Texas.

A small tree, 9 to 15 metres in height, with a trunk 0.30 to 0.60 metre in diameter; generally on dry, gravelly hillsides and knolls; reaching its greatest development in southern Arkansas; common.

Wood heavy, very strong and hard, tough, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; medullary rays numerous, obscure; color light brown tinged with red, or, like the sap-wood, often nearly white; used for posts, levers, handles of tools, etc.

293. Carpinus Caroliniana, Walt.

Hornbeam. Blue Beech. Water Beech. Iron-wood.

Nova Scotia, southern New Brunswick, northern shores of Georgian Bay, southern peninsula of Michigan to northern Minnesota, south to Cape Malabar and Tampa Bay, Florida, and the valley of the Trinity River, Texas, west to central Iowa, eastern Kansas, and the valley of the Poteau River, Indian Territory.

A small tree, 9 to 15 metres in height, with a trunk sometimes 0.60 to 0.90 metre in diameter, or at the North much smaller and often reduced to a low shrub; borders of streams and swamps, in moist soil; most common and reaching its greatest development along the western slopes of the southern Alleghany Mountains and in southern Arkansas and eastern Texas.

Wood heavy, very strong and hard, close-grained, inclined to check in drying; medullary rays numerous, broad; color light brown, the thick sap-wood nearly white; sometimes used for levers, handles of tools, etc.

BETULACEÆ.

294. Betula alba, var. populifolia, Spach.

White Birch. Old-field Birch. Gray Birch.

New Brunswick and the valley of the lower Saint Lawrence River to the southern shores of Lake Ontario, south, generally near the coast, to northern Delaware.

A small tree, 6 to 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter; dry, gravelly, barren soil, or borders of swamps.

Wood light, soft, not strong, close-grained, liable to check in drying, not durable; medullary rays numerous, obscure; color light brown, the sap-wood nearly white; largely used in the manufacture of spools, shoe-pegs, wood-pulp, etc., for hoop-poles and fuel.

The bark and leaves, as well as those of *B. papyrifera* and *B. lenta*, are popularly esteemed as a remedy for various chronic diseases of the skin, bladder, etc., and in rheumatic and gouty complaints; the empyreumatic oil of birch obtained from the inner bark by distillation is used externally and internally for the same purposes.

295. *Betula papyrifera*, Marsh.

Canoe Birch. White Birch. Paper Birch.

Northern Newfoundland and Labrador to the southern shores of Hudson Bay, and northwest to the Great Bear Lake and the valley of the Yukon River, Alaska, south, in the Atlantic region to Long Island, New York, the mountains of northern Pennsylvania, central Michigan, northeastern Illinois and central Minnesota; in the Pacific region south to the Black Hills of Dakota, the Bitter-root Mountains and Flathead Lake, Montana, northern Washington, and the valley of the lower Fraser River, British Columbia.

A tree 18 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rich woodlands and banks of streams; very common in the northern Atlantic region, and reaching a higher latitude than any deciduous tree of the American forest.

Wood light, strong, hard, tough, very close-grained, compact; medullary rays numerous, obscure; color brown tinged with red, the sap-wood nearly white; largely used in the manufacture of spools, shoe lasts and pegs, in turnery, for fuel, wood-pulp, etc.

The very tough, durable bark, easily separated into thin layers, is impervious to water, and is largely used in the manufacture of canoes, tents, etc.

296. *Betula occidentalis*, Hook.

Black Birch.

British Columbia, south to northern California, and through the interior ranges and Rocky Mountains to Montana, Utah, and northern New Mexico.

A small tree, 8 to 12 metres in height, with a trunk sometimes 0.30 to 0.45 metre in diameter; mountain cañons and borders of streams, in moist soil, often throwing up several stems from the ground and forming dense thickets.

Wood soft, strong, brittle, close-grained, compact; medullary rays numerous, obscure; color light brown, the sap-wood lighter; somewhat used for fencing, fuel, etc.

297. *Betula lutea*, Michx. f.

Yellow Birch. Gray Birch.

Newfoundland, northern shores of the Gulf of Saint Lawrence to the western shores of Lake Superior and Rainy Lake, south through the northern States to Delaware and southern Minnesota, and along the Alleghany Mountains to the high peaks of North Carolina and Tennessee.

The largest and one of the most valuable deciduous trees of the northern Atlantic forests, often 21 to 29 metres in height, with a trunk 0.90 to 1.20 metres in diameter; rich woodlands; common.

Wood heavy, very strong and hard, very close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, obscure; color light brown tinged with red, the heavier sap-wood nearly white; largely used for fuel, in the manufacture of furniture, button and tassel moulds, pill and match boxes, and for the hubs of wheels.

298. *Betula nigra*, L.

Red Birch. River Birch.

Banks of the Merrimac and Spicket Rivers, Massachusetts, Long Island, New York, south through the coast and middle districts to western Florida, west to western Iowa, northwestern Missouri, eastern Kansas, the Indian Territory, and the valley of the Trinity River, Texas.

A tree 18 to 24 metres in height, with a trunk rarely exceeding 0.75 metre in diameter; banks of streams and ponds; very common and reaching its greatest development in the South Atlantic and Gulf States.

Wood light, rather hard, strong, close-grained, compact; medullary rays numerous, obscure; color brown, the sap-wood much lighter; used in the manufacture of furniture, wooden-ware, wooden shoes, ox-yokes, etc.

299. *Betula lenta*, L.

Cherry Birch. Black Birch. Sweet Birch. Mahogany Birch.

Newfoundland and the valley of the Saguenay River, west through Ontario to the islands of Lake Huron, south to northern Delaware and southern Indiana, and along the Alleghany Mountains to western Florida, extending west to middle Kentucky and Tennessee.

A tree 18 to 24 metres in height, with a trunk 0.90 to 1.50 metres in diameter; rich woods; very common in all northern forests.

Wood heavy, very strong and hard, close-grained, compact, satiny, susceptible of a beautiful polish; medullary rays numerous, obscure; color dark brown tinged with red, the sap-wood light brown or yellow; now largely used in the manufacture of furniture and for fuel; in Nova Scotia and New Brunswick largely in ship-building.

300. *Alnus maritima*, Muhl.

Seaside Alder.

Southern Delaware and eastern Maryland, near the coast; valley of the Red River, Indian Territory, in about longitude 96° 30' W.; Manchuria and Japan (*A. maritima*, *Japonica*, and *arguta*, Regel).

A small tree, 6 to 7 metres in height, with a trunk 0.10 to 0.15 metre in diameter; borders of streams and swamps.

Wood light, soft, close-grained, checking badly in drying; medullary rays broad, conspicuous; color light bright brown, the sap-wood hardly distinguishable, somewhat lighter.

301. *Alnus rubra*, Bong.

Alder.

Sitka, south through the islands and Coast Ranges of British Columbia, western Washington, Oregon, and California to Santa Barbara, extending east through the Blue Mountains of Washington and Oregon to northern Montana.

A large tree, 24 to 30 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or in British Columbia and the Blue Mountains often reduced to a low shrub; bottom-lands and borders of streams; most common and reaching its greatest development in western Washington and Oregon.

Wood light, soft, not strong, brittle, very close-grained, compact, easily worked, satiny, susceptible of a beautiful polish; medullary rays distant, broad; color light brown tinged with red, the sap-wood nearly white; largely used in Oregon in the manufacture of furniture.

302. *Alnus rhombifolia*, Nutt.

Alder.

Valley of the lower Fraser River, British Columbia, south through the Coast Ranges to southern California, extending east along the ranges of Washington to Clear Creek, Idaho, and the valley of the Flathead River, Montana.

A small tree, 9 to 15 metres in height, with a trunk sometimes 0.60 to 0.90 metre in diameter, or toward its northern and eastern limits reduced to a shrub; borders of streams; the common alder of the California valleys.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, obscure; color light brown, the sap-wood lighter, often nearly white.

303. *Alnus oblongifolia*, Torr.

Alder.

San Bernardino and Cuyamaca Mountains, California, through the ranges of southern Arizona and New Mexico to the valley of the upper Rio Grande; in northern Mexico.

A tree 15 to 21 metres in height, with a trunk 0.90 to 1.20 metres in diameter; borders of streams in deep mountain cañons.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very obscure; color light brown tinged with yellow, the sap-wood nearly white.

304. *Alnus serrulata*, Willd.

Black Alder. Smooth Alder.

Massachusetts, west to southern Missouri, south to northern Florida and the valley of the Trinity River, Texas.

A small tree, 6 to 12 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or more often a tall, branching shrub forming dense thickets; borders of streams and swamps, probably reaching its greatest development in southern Arkansas.

Wood light, soft, close-grained, compact; medullary rays numerous, conspicuous; color light brown, the sap-wood lighter.

A decoction of the bark and leaves, as well as those of *A. incana*, is a popular remedy against impurity of the blood and in the treatment of diarrhœa, hæmaturia, etc.

305. *Alnus incana*, Willd.

Speckled Alder. Hoary Alder. Black Alder.

Newfoundland to the eastern base of the Rocky Mountains, south to northern New England, Wisconsin, Minnesota, and eastern Nebraska; in Europe.

A small tree, 6 to 7 metres in height, with a trunk 0.10 to 0.15 metre in diameter, or more often a tall, branching shrub; borders of streams and swamps. A form with leaves green and glabrous on both sides or slightly pubescent, extending through the mountain ranges of the Pacific region from the Saskatchewan and British Columbia to New Mexico and the southern Sierra Nevadas of California, is var. *virescens*, Watson.

Wood light, soft, close-grained, checking in drying; medullary rays numerous, broad; color light brown, the sap-wood nearly white; preferred and largely used in northern New England in the final baking of bricks, and occasionally, as well as that of *A. serrulata*, in the manufacture of gunpowder.

SALICACEÆ.

306. *Salix nigra*, Marsh.

Black Willow.

Southern New Brunswick and the northern shores of Lakes Huron and Superior southward through the Atlantic region to Bay Biscayne and the Caloosa River, Florida, and the valley of the Guadalupe River, Texas;

Pacific region, — valleys of the Sacramento River, California, and the Colorado River, Arizona.

A small tree, sometimes 15 to 18 metres in height, with a trunk rarely 0.60 metre in diameter, or in southern Florida reduced to a low shrub; banks of streams; most common in the basin of the Mississippi River, and reaching its greatest development on the rich bottom-lands of the Colorado and other rivers of eastern Texas; varying greatly in the size and shape of the leaves (vars. *angustifolia*, *longifolia*, *latifolia*, etc., Anders.), length and habit of the aments, etc. (vars. *marginata* and *Wrightii*, Anders., var. *Wardii*, Bebb).

Wood light, soft, weak, close-grained, checking badly in drying; medullary rays obscure; color brown, the sap-wood nearly white.

The tonic and astringent bark is used domestically as a popular febrifuge, containing, in common with all the species of the genus, salicylic acid, — a powerful antipyretic now successfully used in the treatment of acute cases of gout, rheumatism, typhoid fever, etc.

307. *Salix amygdaloides*, Anders.

Willow.

Shores of the great lakes (New York and Ohio), west to the valley of the Saskatchewan, and southward through the Rocky Mountain region to southern New Mexico; banks of the lower Columbia River, Oregon.

A small tree, rarely 9 to 12 metres in height, with a trunk 0.15 to 0.30 metre in diameter; borders of streams.

Wood light, soft, not strong, close-grained, checking in drying; color light brown, the sap-wood nearly white.

308. *Salix lævigata*, Bebb.

Willow.

California, — Sierra County and the valley of the Sacramento River to the southern boundary of the State.

A tree sometimes 15 metres in height, with a trunk 0.30 to 0.60 metre in diameter; borders of streams and bottom-lands. Forms varying in the shape of the leaves, length of aments, etc., are vars. *angustifolia* and *congesta*, Bebb.

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very thin; color light brown tinged with red.

309. *Salix lasiandra*, Benth.

Willow.

British Columbia, south to the valley of the Sacramento River, California; mountains of Utah, Colorado to New Mexico (var. *Fendleriana*).

A tree 12 to 18 metres in height, with a trunk sometimes 0.60 metre in diameter; banks of streams; very common; varying in the shape of the leaves and character of the aments (var. *lancifolia* and *Fendleriana*, Bebb).

Wood light, soft, not strong, brittle, close-grained, compact; medullary rays numerous, very obscure; color light brown, the sap-wood lighter or often nearly white.

310. *Salix longifolia*, Muhl.

Sand-bar Willow.

Valley of the Connecticut River and of the Potomac River at Washington; west and northwest through the region of the great lakes to the valley of the Mackenzie River, in latitude 66° N., through the Mississippi basin, Texas, the Rocky Mountain region, and the Pacific Coast States.

A small tree, 6 to 9 metres in height, with a trunk rarely exceeding 0.30 metre in diameter; borders of streams and river sand-bars, in low, wet sandy soil, often forming low, dense clumps; rare east of the Alleghany Mountains; very common throughout the Mississippi River basin, and reaching its greatest development in the valleys of Oregon and northern California.

Forms found from western Texas to Oregon, varying in the shape of the leaves, aments, nature of pubescence, etc., are var. *exigua*, Bebb, and var. *argrophylla*, Anders.

Wood light, soft, very close-grained, compact; medullary rays numerous, very obscure; color brown tinged with red, the sap-wood brown.

311. *Salix sessilifolia*, Nutt.

Puget Sound southward, near the coast, and through the California Coast Ranges.

A small tree, 9 to 12 metres in height, with a trunk rarely exceeding 0.30 to 0.45 metre in diameter; borders of streams, in low, wet ground.

A form with narrower entire leaves, of the Sacramento Valley and the California Coast Ranges, is var. *Hindsiana*, Anders.

Wood light, soft, close-grained, compact; medullary rays thin; color light red, the sap-wood nearly white.

312. *Salix discolor*, Muhl.

Glaucous Willow.

Labrador, west to the valleys of the Peace and Athabasca Rivers, southward through the Atlantic region to Delaware and southern Missouri.

A small tree, rarely exceeding 6 metres in height, with a trunk sometimes 0.30 metre in diameter, or more often a tall, straggling shrub 3 to 6 metres in height; borders of streams and swamps, in low, wet soil; varying greatly in the form of leaves, aments, and nature of pubescence.

Wood light, soft, close-grained, compact, containing many evenly distributed small open ducts; medullary rays and layers of annual growth not obscure; color brown streaked with orange, the sap-wood light brown.

313. *Salix flavescens*, Nutt.

Willow.

Rocky Mountains of Idaho and Montana southward to southern New Mexico; on the Cascade Mountains, Oregon, and the Sierra Nevada, California.

A small tree, sometimes 6 to 9 metres in height, with a trunk rarely 0.30 metre in diameter; borders of streams, reaching its greatest development in the southern Rocky Mountain region. A form found from Alaska to California upon dry hillsides and slopes near the coast, distinguished by its broadly obovate leaves, larger size, heavier and harder wood, and dark sap-wood, is var. *Scouleriana*, Bebb.

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, obscure; color brown tinged with red, the sap-wood nearly white.

314. *Salix Hookeriana*, Barratt.

Grand Rapids of the Saskatchewan; coast of Washington Territory and Oregon.

A small tree, 8 to 9 metres in height, with a trunk rarely 0.30 metre in diameter, or more often a low, straggling shrub with many prostrate stems; on the coast generally along the edge of beaches, or in low, rather moist, sandy soil.

Wood light, soft, close-grained, compact, containing many minute open ducts; medullary rays thin, very obscure; color light brown tinged with red, the sap-wood nearly white.

315. *Salix cordata*, var. *vestita*, Anders.

Diamond Willow.

Valley of the Missouri River and its tributaries, — Fort Osage, Missouri, Iowa, Nebraska, and westward to about the one hundred and tenth meridian.

A small tree, rarely 8 metres in height, with a trunk 0.15 to 0.20 metre in diameter, or more often a low, straggling shrub, not exceeding 1.80 to 3 metres in height; bottom-lands, in wet, sandy soil. *S. cordata*, Muhl., of wide distribution through the Atlantic region, rarely, if ever, attains arborescent size or habit.

Wood light, soft, close-grained, compact, reported very durable in contact with the ground; annual layers of growth clearly defined; medullary rays very obscure; color brown or often tinged with red, the sap-wood nearly white; used for fence-posts.

316. *Salix lasiolepis*, Benth.*Willow*

California, — valley of the Klamath River, southward through the western portions of the State, reaching in the Sierra Nevada an elevation of 3,500 to 4,000 feet above the sea.

A small tree, sometimes 12 to 18 metres in height, with a trunk 0.45 to 0.50 metre in diameter, or northward and at high elevations reduced to a low shrub; leaves varying greatly in shape and breadth (vars. *angustifolia* and *latifolia*, Anders.), or toward its southern limit often persistent until spring (*S. Hartwegi*, Benth.).

Wood light, soft, not strong, close-grained, compact; medullary rays numerous, thin; color light brown, the sap-wood nearly white; somewhat used as fuel, especially in the southern part of the State.

317. *Salix Sitchensis*, Sans.*Silky Willow.*

Alaska, southward near the coast to Santa Barbara, California.

A low, much-branched tree, rarely exceeding 8 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or more often a straggling shrub; low, wet soil, borders of streams and ponds. A form with narrow oblanceolate leaves is var. *angustifolia*, Bebb.

Wood light, soft, close-grained, compact; medullary rays numerous, thin; color light red, the sap-wood nearly white.

318. *Populus tremuloides*, Michx.*Aspen. Quaking Asp.*

Northern Newfoundland and Labrador to the southern shores of Hudson Bay, northwest to the Great Bear Lake, the mouth of the Mackenzie River, and the valley of the Yukon River, Alaska; south in the Atlantic region to the mountains of Pennsylvania, southern Indiana and Illinois, and northern Kentucky; in the Pacific region south to the valley of the Sacramento River, California, and along the Rocky Mountains and interior ranges to southern New Mexico, Arizona, and central Nevada.

A small tree, 15 to 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; very common through British America, and spreading over enormous areas stripped by fire of other trees; in the Pacific region very common upon moist mountain slopes and bottoms between 6,000 and 10,000 feet elevation; the most widely distributed North American tree.

Wood light, soft, not strong, close-grained, compact, not durable, containing, as does that of the whole genus, numerous minute scattered open ducts; medullary rays very thin, hardly distinguishable; color light brown, the thick sap-wood nearly white; largely manufactured into wood-pulp; in the Pacific region sometimes used for fuel, flooring, in turnery, etc.

A bitter principle in the bark causes its occasional use as a tonic in the treatment of intermittent fevers and cases of debility.

319. *Populus grandidentata*, Michx.

Poplar.

Nova Scotia, New Brunswick, and west through Ontario to northern Minnesota, south through the Northern States and along the Alleghany Mountains to North Carolina, extending west to middle Kentucky and Tennessee.

A tree 21 to 24 metres in height, with a trunk 0.50 to 0.75 metre in diameter; rich woods and borders of streams and swamps.

Wood light, soft, not strong, close-grained, compact; medullary rays thin, obscure; color light brown, the sap-wood nearly white; largely manufactured into wood-pulp and occasionally used in turnery, for wooden-ware, etc.

320. *Populus heterophylla*, L.

River Cottonwood. Swamp Cottonwood.

Connecticut, Northport, Long Island, south, generally near the coast, to southern Georgia, through the Gulf States to western Louisiana, and through Arkansas to central Tennessee and Kentucky, southern Illinois and Indiana.

A tree 24 to 27 metres in height, with a trunk 0.60 to 0.75 metre in diameter; borders of river swamps; most common and reaching its greatest development in the basin of the lower Ohio River; rare and local.

Wood light, soft, not strong, close-grained, compact; medullary rays thin, very obscure; color dull brown, the thick sap-wood lighter brown.

321. *Populus balsamifera*, L.

Balsam. Tacamahac. Balm of Gilead.

Straits of Belle Isle to the shores of Hudson Bay, northwest to the shores of the Great Bear Lake and the valley of the Yukon River, Alaska, south to northern New England, central Michigan and Minnesota, the Rocky Mountains and interior ranges of Montana and Idaho, Washington, and British Columbia.

A large tree, 18 to 24 metres in height, with a trunk 1.50 to 2.10 metres in diameter; very common on all islands and shores of the northern rivers; in British Columbia generally confounded with the allied *P. trichocarpa*, the range of the two species here still uncertain. A form with broader heart-shaped leaves, white on the under side, rare or unknown in a wild state, very common in cultivation, is var. *candicans*, Gray.

Wood very light, soft, not strong, close-grained, compact; medullary rays numerous, very obscure; color brown, the thick sap-wood nearly white.

The buds, as well as those of several other species, are covered with a resinous exudation, which is occasionally used medicinally as a substitute for turpentine and other balms.

322. *Populus angustifolia*, James.

Black Cottonwood.

Black Hills of Dakota, eastern and southwestern Montana, east Humboldt and Shoshone Mountains, Nevada, Rocky Mountains of Colorado, and on the ranges of southwestern New Mexico and eastern Arizona.

A small tree, 15 to 18 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; borders of streams, between 6,000 and 10,000 feet elevation.

Wood light, soft, weak, close-grained, compact; medullary rays numerous, obscure; color brown, the sap-wood nearly white.

323. *Populus trichocarpa*, Torr. & Gray.

Black Cottonwood. Balsam Cottonwood.

Valley of the Fraser River, British Columbia, and probably much farther north, east to the eastern base of the Bitter Root Mountains, Montana, south through Washington, western Oregon and California to the southern borders of the State.

A large tree, 24 to 60 metres in height, with a trunk 1.20 to 2.10 metres in diameter; banks of streams and bottom-lands below 6,000 feet elevation; very common and reaching its greatest development in the valleys of the lower Columbia River and the streams flowing into Puget Sound, here the largest deciduous tree of the forest.

Wood very light, soft, not strong, rather close-grained, compact; medullary rays thin, hardly distinguishable; color light dull brown, the sap-wood lighter, nearly white; in Oregon and Washington largely manufactured into staves of sugar-barrels, wooden-ware, etc.

324. *Populus monilifera*, Ait.

Cottonwood. Necklace Poplar. Carolina Poplar. Big Cottonwood.

Shores of Lake Champlain, Vermont, south through western New England to western Florida, west to the eastern base of the Rocky Mountains of Montana, Colorado, and New Mexico.

A large tree, 24 to 51 metres in height, with a trunk 1.20 to 2.40 metres in diameter; low, moist soil; the common cottonwood of Texas and the western plains, bordering all streams flowing east from the Rocky Mountains.

Wood very light, soft, not strong, close-grained, compact, liable to warp in drying, difficult to season; medullary rays numerous, obscure; color dark brown, the thick sap-wood nearly white; largely used in the manufacture of paper-pulp, for light packing-cases, fence-boards, and fuel.

325. *Populus Fremontii*, Watson.*Cottonwood.*

California, valley of the upper Sacramento River, south to San Bernardino County, extending eastward in Nevada and Utah. A form distinguished by its sharply acuminate leaves, truncate at the base (var. *Wislizeni*, Watson), is common along all the larger streams from southern California, through Arizona and New Mexico, to western Texas and southern Colorado.

A large tree, 24 to 30 metres in height, with a trunk 1.20 to 1.80 metres in diameter; borders of streams; the common cottonwood of the valleys of central California.

Wood light, soft, not strong, close-grained, compact, liable to warp in drying, difficult to season; medullary rays thin, very obscure; color light brown, the sap-wood nearly white.

CONIFERÆ.**326. *Libocedrus decurrens*, Torr.***White Cedar. Bastard Cedar. Post Cedar. Incense Cedar.*

Oregon, south along the western slopes of the Cascade and Sierra Nevada Mountains between 3,000 and 8,500 feet elevation, and through the California Coast Ranges to the San Bernardino and Cuyamaca Mountains.

A large tree, 30 to 45 metres in height, with a trunk 1.20 to 2.10 metres in diameter; slopes and valleys; common.

Wood light, soft, not strong, brittle, close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, obscure; the thin sap-wood nearly white; largely used for fencing and in the construction of water-flumes, and for interior finish, furniture, laths, shingles, etc.; often injured by a species of dry rot (*Dædalía vorax*), rendering it unfit for lumber.

327. *Thuja occidentalis*, L.*White Cedar. Arbor-vitæ.*

New Brunswick, valley of the Saint Lawrence River to the southern shores of James Bay and southeast to Lake Winnipeg, south through the Northern States to central New York, northern Pennsylvania, central Michigan, northern Illinois, central Minnesota, and along the Alleghany Mountains to the high peaks of North Carolina.

A tree 12 to 18 metres in height, with a trunk sometimes 1.20 to 1.50 metres in diameter; cold, wet swamps, and rocky banks of streams; very common at the North, often covering great areas of swamp.

Wood very light, soft, not strong, brittle, rather coarse-grained, compact, very durable in contact with the soil; the bands of small summer cells very thin, dark-colored; medullary rays numerous, indistinct; color light brown, turning darker with exposure, the thin sap-wood nearly white; largely used for posts, fencing, railway-ties, and shingles.

The distilled oil and a tincture of the leaves of *Thuja* have been found useful in the treatment of pulmonary and uterine complaints.

328. *Thuja gigantea*, Nutt.

Red Cedar. Canoe Cedar.

Alaska, south along the Coast Ranges and islands of British Columbia, through western Washington and Oregon and the Coast Ranges of northern California, extending east along the mountains of Washington to the Cœur d'Alêne, Bitter Root, and Salmon River Mountains of Idaho and the western slopes of the Rocky Mountains of northern Montana.

A large tree, 30 to 45 metres in height, with a trunk 0.90 to 3.60 metres in diameter; low, rich woods and swamps, less commonly on dry ridges and slopes below 5,200 feet elevation; common and reaching its greatest development in western Washington and Oregon; the large specimens generally hollow.

Wood very light, soft, not strong, brittle, rather coarse-grained, compact, easily worked, very durable in contact with the soil; bands of small summer cells thin, dark-colored, distinct; medullary rays numerous, obscure; color dull brown tinged with red, the thin sap-wood nearly white; largely used for interior finish, fencing, shingles, in cabinet-making and cooperage, and by the Indians of the northwest coast in the manufacture of their canoes.

329. *Chamæcyparis sphæroidea*, Spach.

White Cedar.

Southern Maine, south near the coast to northern Florida, and along the Gulf Coast to the valley of the Pearl River, Mississippi.

A tree 24 to 27 metres in height, with a trunk 0.60 to 1.20 metres in diameter; deep, cold swamps; rare in the Gulf States, west of the Bay of Mobile.

Wood very light and soft, not strong, close-grained, compact, easily worked, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, obscure; color light brown tinged with red, growing darker with exposure, the sap-wood lighter; largely used in boat-building, for wooden-ware, cooperage, shingles, interior finish, telegraph and fence posts, railway-ties, etc.

330. *Chamæcyparis Nutkaensis*, Spach.

Yellow Cypress. Sitka Cypress.

Sitka, south along the islands and Coast Ranges of British Columbia and the Cascade Mountains of Washington and Oregon to the valley of the Santian River, Oregon.

A large tree of great economic value, 30 to 38 metres in height, with a trunk 1.20 to 1.80 metres in diameter, or toward its southern limits and at high elevations much smaller; common along the coast at the sea-level to about latitude $49^{\circ} 30'$, then less common and only at higher elevations; within the United States hardly below 5,000 feet elevation and very rare and local; the most valuable timber tree of Alaska.

Wood light, hard, not strong, brittle, very close-grained, compact, very durable in contact with the soil, easily worked, satiny, susceptible of a beautiful polish, possessing an agreeable resinous odor; bands of small summer cells thin, not conspicuous; medullary rays thin, numerous, hardly distinguishable; color bright light clear yellow, the thin sap-wood nearly white; somewhat used in boat and ship building, for furniture, interior finish, etc.

331. *Chamæcyparis Lawsoniana*, Parl.

Port Orford Cedar. Oregon Cedar. White Cedar. Lawson's Cypress. Ginger Pine.

Oregon, — Coos Bay, south to the valley of the Rogue River, not extending more than thirty miles from the coast; California, — valley of the upper Sacramento River (shores of Castle and Soda Lakes, Shasta County).

A large tree of the first economic value, 45 to 61 metres in height, with a trunk 1.80 to 4 metres in diameter; rich woods, in low, moist soil, interspersed among the red fir and hemlock; most common and reaching its greatest development along the Oregon coast; local; in California very rare and local.

Wood light, hard, strong, very close-grained, compact, easily worked, very durable in contact with the ground, abounding in odoriferous resin, satiny, susceptible of a beautiful polish; layers of small summer cells thin, not conspicuous; medullary rays numerous, very obscure; color light yellow or almost white, the thin sap-wood hardly distinguishable; largely manufactured into lumber and used for interior finish, flooring, railway-ties, fence-posts, matches, and in ship and boat building; the resin strongly diuretic and a powerful insecticide.

332. *Cupressus macrocarpa*, Hart.

Monterey Cypress.

California, — Cypress Point, Pescadero Ranch, and Carmelo Point, near Monterey.

A tree 15 to 21 metres in height, with a trunk 1.20 to 1.80 metres in diameter; on granite rocks immediately upon the sea-coast; very local.

Wood heavy, hard, strong, rather brittle, very close-grained, compact, easily worked, very durable in contact with the soil, satiny, susceptible of a beautiful polish, odorous; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, hardly distinguishable; color clear bright brown streaked with red and yellow, the thin sap-wood light yellow.

333. *Cupressus Goveniana*, Gord.

Humboldt County, California, south along the coast and through the Coast Ranges into lower California.

A small tree, sometimes 12 to 15 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of streams and mountain slopes, in rather rich soil, or often a low shrub, occupying extensive tracts of sandy barrens or thin, rocky soil, 1 to 5 miles inland from the coast; widely but not generally distributed.

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells broad, dark-colored, conspicuous; medullary rays thin, obscure; color light brown, the thick sap-wood nearly white.

334. *Cupressus Macnabiana*, Murr.

California, — mountains south of Clear Lake, Lake County.

A small tree, sometimes 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter, or more often a tall shrub branching from the ground; very rare and local.

Wood not collected.

335. *Cupressus Guadalupensis*, Watson.

San Francisco Mountains of New Mexico and eastern Arizona, Santa Catalina and Santa Rita Mountains, Arizona; Sierra Madre, near Saltillo, and Guadalupe Island, Mexico.

A tree 18 to 21 metres in height, with a trunk 0.60 to 0.90 metre in diameter; rocky cañons and ridges; forming on the New Mexico and Arizona Mountains extensive forests between 5,000 and 8,000 feet elevation, generally on northern slopes; local.

Wood light, soft, very close-grained, compact, easily worked, susceptible of a good polish; bands of small summer cells broad, conspicuous; medullary rays numerous, very obscure; color gray, often faintly streaked with yellow, the thick sap-wood light yellow.

336. *Juniperus Californica*, Carr.

Juniper.

California, — valley of the Sacramento River south through the Coast Ranges to lower California.

A small tree, rarely 6 to 9 metres in height, with a trunk 0.30 to 0.60 metre in diameter, or more often a tall shrub, sending up many stems from the ground; sandy barrens and dry, rocky soil.

A form (var. *Utahensis*, Engelm.) with more slender branchlets and smaller globose fruit found from the western base of the Wahsatch Mountains, Utah, to eastern California, and south through the Great Basin to southeastern California and the San Francisco Mountains, eastern Arizona, is very common in the elevated valleys and along the lower slopes of all the ranges of central and southern Utah and Nevada, and is the most generally distributed arborescent species of the region.

Wood light, soft, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark-colored, not conspicuous; medullary rays numerous, very obscure; color light brown slightly tinged with red, the sap-wood nearly white; in southern California largely used for fencing and fuel.

337. *Juniperus pachyphloea*, Torr.

Juniper.

Mountains of western Texas, southern New Mexico and Arizona south of latitude 34°; in northern Mexico.

A tree 9 to 15 metres in height, with a trunk 0.60 to 1.20 metres in diameter; dry, stony slopes and ridges, generally between 2,000 and 3,000 feet elevation; the prevailing and largest juniper of the mountains of western Texas.

Wood light, soft, not strong, brittle, very close-grained, compact, susceptible of a fine polish; bands of small summer cells very thin, dark-colored, not conspicuous; medullary rays numerous, obscure; color clear light red, often streaked with yellow, the thin sap-wood nearly white.

338. *Juniperus occidentalis*, Hook.

Juniper.

Blue Mountains and high prairies of eastern Washington and Oregon, Cascade Mountains of Oregon, valley of the Klamath River, California, and south along the high ridges of the Sierra Nevada, between 7,000 and 10,000 feet elevation, to the San Bernardino Mountains.

A tree 9 to 15 metres in height, with a trunk 1.20 to 2.10 metres in diameter, or often a low, much-branched shrub; dry, rocky ridges and prairies, reaching its greatest development in the California Sierras.

Wood light, soft, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, not conspicuous; medullary rays numerous, very obscure; color light red or brown, the sap-wood nearly white; largely used for fencing and fuel.

A variety (var. *monosperma*, Engelm.) with smaller, generally 1-seeded berries, extends from the eastern base of Pike's Peak, Colorado, to the

mountains of western Texas, and through New Mexico and southern Arizona to southern California.

A small, stunted tree, 6 to 9 metres in height, with a trunk sometimes 0.60 metre in diameter, or often branching from the ground with many stout, contorted stems; dry, gravelly slopes between 3,500 and 7,000 feet elevation.

Wood heavier than that of the type, the layers of annual growth often eccentric; largely used for fuel and fencing.

A variety (var. *conjugens*, Engelm.) with slender branchlets and 4 ranked, closely appressed denticulate leaves and globose 1-2-seeded fruit, extends from the valley of the Colorado River, Texas, west and north.

A tree 11 to 15 metres in height, with a trunk sometimes 0.30 metre in diameter, covering with extensive forests the limestone hills of western Texas; its range not yet satisfactorily determined.

Wood light, hard, not strong, very close-grained, compact, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, very obscure; color brown often streaked with red, the thin sap-wood nearly white; largely used for fencing, fuel, telegraph-poles, railway-ties, etc.

339. *Juniperus Virginiana*, L.

Red Cedar. Savin.

Southern New Brunswick, shores of Georgian Bay, northern Michigan, northern Wisconsin and Minnesota, south to Cape Malabar and Tampa Bay, Florida, and the valley of the Colorado River, Texas, west to eastern Nebraska, Kansas, and the Indian Territory to about the one hundredth parallel of west longitude; in the Pacific region, Rocky Mountains of Colorado to Vancouver's Island, British Columbia; not extending to western Texas, California, or Oregon; in Utah, Nevada, and Arizona rare and local.

The most widely distributed of North American *Coniferæ*, a tree 24 to 30 metres in height, with a trunk 0.60 to 1.35 metres in diameter, or toward its northern and western limits much smaller, often reduced to a low shrub; dry, gravelly ridges, and limestone hills, or in the Gulf States, especially, near the coast, in deep swamps; common and reaching its greatest development in the valley of the Red River, Texas.

Wood light, soft, not strong, brittle, very close and straight-grained, compact, easily worked, very durable in contact with the soil, odorous; bands of small summer cells rather broad, conspicuous; medullary rays numerous, very obscure; color dull red, the thin sap-wood nearly white; largely used for posts, sills, railway-ties, interior finish, cabinet-making, and lead-pencils.

A decoction of the leaves is occasionally used as a substitute for *savine cerete*, and an infusion of the berries as a diuretic.

340. *Taxodium distichum*, Rich.

Bald Cypress. Black Cypress. Red Cypress. White Cypress.
Deciduous Cypress.

Southern Delaware, south near the coast to Mosquito Inlet and Cape Romano, Florida, west through the Gulf States to the valley of the Nueces River, Texas, and through Arkansas to western Tennessee, western and northern Kentucky, southeastern Missouri, and southern Illinois and Indiana.

A large tree, 24 to 46 metres in height, with a trunk 1.80 to 4 metres in diameter; deep, submerged swamps, river bottom-lands, and pine-barren ponds; common and occupying extensive tracts in the South Atlantic and Gulf States in the neighborhood of the coast.

Wood light, soft, close, straight-grained, not strong, compact, easily worked, very durable in contact with the soil; bands of small summer cells broad, resinous, conspicuous; medullary rays numerous, very obscure; color light or dark brown, the sap-wood nearly white; largely manufactured into lumber and used for construction, cooperage, railway-ties, posts, fencing, etc., often injured, especially west of the Mississippi River, by a species of *Dædalia*, rendering it unfit for lumber.

Two varieties of cypress, black and white, are recognized by lumbermen, the wood of the former heavier than water when green, rather harder and considered more durable than the other; the unseasoned wood of the latter lighter than water, and rather lighter colored than black cypress.

341. *Sequoia gigantea*, Decsn.

Big Tree.

California, — western slopes of the Sierra Nevada from Placer County (Calaveras Grove) south to the southern borders of Tulare County.

A tree 76 to 119 metres in height, with a trunk 6 to 11 metres in diameter; valleys and moist swales or hollows between 4,000 and 6,000 feet elevation, growing in small, isolated groves, except toward its southern limits, here mixed with the sugar pine and red and white firs, occupying areas often several hundred acres in extent.

Wood very light, soft, weak, brittle, rather coarse-grained, compact, remarkably durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, thin; color bright clear red, turning much darker with exposure, the thin sap-wood white; formerly somewhat manufactured into lumber, and locally used for fencing, shingles, construction, etc.

342. *Sequoia sempervirens*, Endl.

Redwood.

California, — from the northern boundary of the State, south in the Coast Ranges to the southern border of Monterey County.

A large tree, 61 to 92 metres in height, with a trunk 2.40 to 7 metres in diameter; sides of cañons and valleys in low, wet situations, borders of streams, etc.; not appearing on dry hillsides; generally confined to slopes facing the ocean, and nowhere extending far from the coast; most generally multiplied and reaching its greatest average density north of Cape Mendocino.

Wood light, soft, not strong, very brittle, rather coarse-grained, compact, susceptible of a good polish, easily split and worked, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays numerous, very obscure; color clear light red, the thin sap-wood nearly white; largely sawed into lumber; the prevailing and most valuable building material of the Pacific coast, and in California almost exclusively used for shingles, fence-posts, telegraph-poles, railway-ties, wine-butts, tanning- and water-tanks, coffins, etc.; forms with curled or contorted grain are highly ornamental.

343. *Taxus brevifolia*, Nutt.

Yew.

Islands and Coast Ranges of British Columbia, through western and the mountain ranges of eastern Washington and Oregon to the western slopes of the Rocky Mountains of northern Montana; through the California Coast Ranges to the Bay of Monterey and along the western slopes of the Sierra Nevadas.

A tree 18 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or toward its eastern limits in Idaho and Montana much smaller, often reduced to a low shrub; rare; low, rich woods and borders of streams, reaching its greatest development in western Oregon, Washington, and British Columbia.

Wood heavy, hard, strong, brittle, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; bands of small summer cells thin, dark-colored, conspicuous; medullary rays thin, numerous, very obscure; color light bright red, the thin sap-wood light yellow; used for fence-posts and by the Indians of the northwest coast for paddles, spear-handles, bows, fish-hooks, etc.

344. *Taxus floridana*, Nutt.

Yew.

Western Florida, — banks of the Apalachicola River from Bristol to Aspalaga.

A small tree, 3 to 6 metres in height, with a trunk 0.15 to 0.25 metre in diameter; rare and very local.

Wood heavy, hard, very close-grained, compact; bands of small summer cells very thin, dark-colored, not conspicuous; medullary rays numerous, obscure; color dark brown tinged with red, the thin sap-wood nearly white.

345. *Torreya taxifolia*, Arn.

Stinking Cedar. Savin.

Western Florida, — eastern bank of the Apalachicola River from Chattahoochee to the neighborhood of Bristol.

A tree 12 to 18 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of swamps on calcareous soil; very rare and local.

Wood light, rather hard, strong, brittle, very close-grained, compact, susceptible of a beautiful polish, very durable in contact with the soil; bands of small summer cells very thin, not conspicuous; medullary rays numerous, obscure; color clear bright yellow, the thin sap-wood much lighter; largely used locally for fence-posts, etc.

346. *Torreya Californica*, Torr.

California Nutmeg. Stinking Cedar.

California, — Mendocino County, and along the western slope of the Sierra Nevada to Tulare County, between 3,000 and 5,000 feet elevation.

A tree 15 to 22 metres in height, with a trunk 0.30 to 0.90 metre in diameter; borders of streams, in moist soil; rare.

Wood light, soft, not strong, very close-grained, compact, susceptible of a fine polish, very durable in contact with the soil; bands of small summer cells broad, not conspicuous; medullary rays numerous, obscure; color clear light yellow, the thin sap-wood nearly white.

347. *Pinus Strobus*, L.

White Pine. Weymouth Pine.

Newfoundland, northern shores of the Gulf of Saint Lawrence to Lake Nipigon and the valley of the Winnipeg River, south through the Northern States to Pennsylvania, the southern shores of Lake Michigan; "Starving rock," near La Salle, Illinois, near Davenport, Iowa (very rare and local); and along the Alleghany Mountains to northern Georgia.

A large tree, 24 to 52 metres in height, with a trunk 1.20 to 3.50 metres in diameter; sandy loam, forming extensive forests, or in the region of the great lakes often in small bodies scattered through the hardwood forests, here reaching its greatest development; north of latitude 47° and south of Pennsylvania, central Michigan, and Minnesota much smaller, less common and valuable.

Wood light, soft, not strong, very close, straight-grained, compact, easily worked, susceptible of a beautiful polish; bands of small summer cells thin, not conspicuous; resin passages small, not numerous nor conspicuous; medullary rays numerous, thin; color light brown, often slightly tinged with red, the sap-wood nearly white; more largely manufactured into lumber, shingles, laths, etc., than that of any other North American tree; the common and most valuable building material of the Northern States; largely used in cabinet-making, for interior finish, and in the manufacture of matches, wooden-ware, and for many domestic purposes.

348. *Pinus monticola*, Dougl.*White Pine.*

Vancouver's Island, Coast and Gold Ranges of southern British Columbia, east along the mountains of northern Washington, through the Cœur d'Alène and Bitter Root Mountains of Idaho to the valley of the Flathead River, Montana; south along the Cascade Mountains of Washington and Oregon and the California Sierras to Calaveras County.

A large tree, 30 to 46 metres in height, with a trunk 0.90 to 1.50 metres in diameter; most common and reaching its greatest development in the Pend d'Oreille and Clark's Fork regions of Idaho, here a valuable and important timber tree; in British Columbia generally below 3,000 feet, and in California between 7,000 and 10,000 feet elevation, not common.

Wood very light, soft, not strong, close, straight-grained, compact; bands of small summer cells thin, resinous, not conspicuous; resin passages numerous, not large, conspicuous; medullary rays numerous, obscure; color light brown or red, the sap-wood nearly white; inferior in quality, although resembling that of the Eastern white pine (*P. Strobus*); in Idaho and Montana somewhat manufactured into lumber.

349. *Pinus Lambertiana*, Dougl.*Sugar Pine.*

Oregon, — Cascade and Coast Ranges, from the head of Mackenzie River and the valley of the Rogue River, south; California, — western flank of the Sierra Nevada, through the Coast Ranges to the Santa Lucia Mountains, and in the San Bernardino and Cuyamaca Mountains.

A large tree, 46 to 92 metres in height, with a trunk 3 to 7 metres in diameter; most common and reaching its greatest development upon the Sierras of central and northern California between 4,000 and 8,000 feet elevation; in the Oregon Coast Ranges descending to 1,000 feet above sea-level.

Wood very light, soft, coarse, straight-grained, compact, satiny, easily worked; bands of small summer cells thin, resinous, conspicuous; resin passages numerous, very large and conspicuous; medullary rays numerous, obscure; color light brown, the sap-wood nearly white; now largely manufactured into lumber and used for interior finish, door-blinds, sashes, etc., and for cooperage and wooden-ware; less valuable and less easily worked than that of the Eastern white pine (*Pinus Strobus*); its quality injured by the larger and more numerous resin passages.

A saccharine exudation from the stumps of cut or partially burned trees is sometimes used as a substitute for sugar.

350. *Pinus flexilis*, James.*White Pine.*

Eastern slopes of the Rocky Mountains, Montana, and probably farther north, south to New Mexico, Guadalupe and Limpia Mountains, western

Texas, high mountain ranges of Utah, Nevada, and northern Arizona, Inyo Mountains and Mount Silliman, California.

A tree 15 to 18 metres in height, with a trunk 0.60 to 1.20 metres in diameter; dry, gravelly slopes and ridges between 4,000 and 10,000 feet elevation; common along the eastern slopes of the Rocky Mountains of northern Montana, forming open, scattered forests, and the prevailing forest tree; in central Nevada the most valuable timber tree of the region.

Wood light, soft, close-grained, compact; bands of small summer cells narrow, not conspicuous; resin passages numerous, large; medullary rays numerous, conspicuous; color light clear yellow, turning red with exposure, the sap-wood nearly white; in northern Montana, Nevada and Utah sometimes sawed into inferior lumber and used in construction and for various domestic purposes.

351. *Pinus albicaulis*, Engelm.

Coast Ranges of British Columbia, south along the Cascade and Blue Mountains of Washington and Oregon; California, — Scott Mountains, Mount Shasta, and along the high peaks of the Sierra Nevada to Mount San Bernardino; extending east along the high ranges of northern Washington to the eastern slope of the Rocky Mountains of northern Montana.

A small alpine tree, 6 to 12 metres in height, with a trunk rarely 0.60 metre in diameter, or at its highest elevation reduced to a low, prostrate shrub; dry, gravelly ridges at the extreme limit of tree growth, reaching in the San Bernardino Mountains an elevation of 10,500 feet.

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells thin, not conspicuous; resin passages numerous, not large; medullary rays numerous, obscure; color light brown, the sap-wood nearly white.

352. *Pinus reflexa*, Engelm.

White Pine.

High mountains of southwestern New Mexico to the Santa Rita and Santa Catalina Mountains, Arizona.

A tree 24 to 30 metres in height, with a trunk sometimes exceeding 0.60 metre in diameter; rocky ridges and slopes of almost inaccessible cañons between 6,000 and 8,000 feet elevation.

Wood light, hard, not strong, close-grained, compact; bands of small summer cells thin, resinous, not conspicuous; resin passages few, large; medullary rays numerous, obscure; color light red, the sap-wood nearly white.

353. *Pinus Parryana*, Engelm.

Piñon. Nut Pine.

California, — Larkin's Station, 20 miles southeast of Campo, San Diego County, and in lower California.

A small tree, 6 to 9 metres in height, with a trunk 0.30 to 0.45 metre in diameter; very rare within the limits of the United States; south of the boundary forming in lower California extensive open forests upon high ridges and slopes.

Wood light, soft, close-grained, compact; bands of small summer cells thin, not conspicuous; resin passages very numerous, large, conspicuous; medullary rays numerous, obscure; color light brown or yellow, the sap-wood much lighter, nearly white.

The large seeds edible.

354. *Pinus cembroides*, Zucc.

Piñon. Nut Pine.

Santa Catalina Mountains, Arizona; in northern Mexico.

A small tree, in Arizona 6 to 7 metres in height, with a trunk hardly exceeding 0.30 metre in diameter; dry ridges and slopes at 3,500 feet elevation.

Wood light, soft, very close-grained, compact; bands of small summer cells thin, not conspicuous; resin passages few, small; medullary rays numerous, obscure; color light clear yellow, the sap-wood nearly white.

The seeds edible.

355. *Pinus edulis*, Engelm.

Piñon. Nut Pine.

Eastern base of Pike's Peak, Colorado, south through New Mexico to the mountains of western Texas.

A small tree, 6 to 9 metres in height, with a trunk 0.30 to 0.90 metre in diameter; dry slopes, generally on lime or sandstone, reaching in Colorado an elevation of 9,000 feet.

Wood light, soft, not strong, brittle, close-grained, compact, durable in contact with the soil; bands of small summer cells thin, not conspicuous; resin passages few, small; medullary rays numerous, obscure; color light brown, the sap-wood nearly white; largely used for fuel, charcoal, fencing, etc., and in western Texas occasionally manufactured into inferior lumber.

The large seeds edible.

356. *Pinus monophylla*, Torr. & Frem.

Piñon. Nut Pine.

Western base of the Wahsatch Mountains, Utah, to the eastern foot-hills of the California Sierras, south along the mountain ranges of the Great Basin to the San Francisco Mountains of eastern Arizona.

A small, bushy tree, 4 to 6 metres in height, with a trunk sometimes 1 metre in diameter; dry, gravelly slopes between 3,000 and 6,000 feet elevation.

Wood light, soft, weak, brittle, close-grained, compact; bands of small summer cells thin, not conspicuous; resin passages few, not large; medullary rays numerous, obscure; color yellow or light brown, the sap-wood nearly white; largely used for fuel and charcoal.

The large edible seeds furnish the principal food of the Indians of the Great Basin.

357. *Pinus Balfouriana*, Murr.

Footail Pine. Hickory Pine.

California, — Scott Mountains, Mount Whitney, and about the headwaters of King and Kern Rivers. A form (var. *aristata*, Engelm.), common on the mountains of southeastern California, through Nevada, northern Arizona, and southern Utah to Colorado, above 7,500 feet, and in Colorado reaching 12,000 feet elevation, is distinguished by its ovate cones, with thinner scales and shorter recurved awn-like prickles.

A small tree, 15 to 19 metres in height, with a trunk 0.60 to 0.90 metre in diameter; dry, gravelly slopes and ridges, forming upon Scott Mountains a broad belt of forest growth between 5,000 and 8,000 feet elevation.

Wood light, soft, weak, brittle, very close-grained, compact, satiny, susceptible of a good polish; bands of small summer cells very narrow, dark-colored; resin passages few, not conspicuous; medullary rays numerous, obscure.

358. *Pinus resinosa*, Ait.

Red Pine. Norway Pine.

Newfoundland, northern shores of the Gulf of Saint Lawrence and Lake Nipigon to the valley of the Winnipeg River, south through the Northern States to eastern Massachusetts, the mountains of northern Pennsylvania, central Michigan and Minnesota.

A large tree, 24 to 46 metres in height, with a trunk 0.60 to 1.37 metres in diameter; light sandy loam or dry rocky ridges, forming scattered groves rarely exceeding a few hundred acres in extent; common and reaching its greatest development through northern Wisconsin and Minnesota.

Wood light, not strong, hard, rather coarse-grained, compact; bands of small summer cells broad, dark-colored, very resinous; resin passages few, small, not conspicuous; medullary rays numerous, thin; color light red, the sap-wood yellow or often almost white; largely manufactured into lumber and used for all purposes of construction, flooring, piles, etc.

359. *Pinus Torreyana*, Parry.

California, — mouth of the Soledad River, San Diego County.

A low, short-lived, gnarled, crooked tree, 6 to 8 metres in height, with

a trunk 0.23 to 0.33 metre in diameter ; crests of sandy bluffs immediately upon the sea-coast ; very local and fast disappearing.

Wood light, soft, not strong, brittle, rather close-grained, compact ; bands of small summer cells broad, resinous, conspicuous ; resin passages small, few ; medullary rays numerous, obscure ; color light red, the sap-wood yellow or nearly white ; locally used for fuel.

360. *Pinus Arizona*, Engelm.

Yellow Pine.

Santa Rita Mountains, Santa Catalina Mountains, and probably upon other ranges of southern Arizona.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter ; high rocky ridges between 6,000 and 8,000 feet elevation, and forming extensive forests near the summits of the Santa Catalina Mountains.

Wood light, soft, not strong, rather brittle, close-grained, compact ; bands of small summer cells broad, very resinous, conspicuous ; resin passages numerous, large ; medullary rays thin, obscure ; color light red or often yellow, the sap-wood lighter yellow or white ; sometimes sawed into inferior lumber.

361. *Pinus ponderosa*, Dougl.

Yellow Pine. Bull Pine.

Interior of British Columbia, south of latitude 51°, south and east along the mountain ranges of the Pacific Region to Mexico, the Black Hills of Dakota, Colorado, and western Texas ; not detected in central or southern Nevada.

A large tree, 61 to 91 metres in height, with a trunk 3.60 to 4.57 metres in diameter, or throughout the Rocky Mountain region much smaller, rarely exceeding 30 metres in height (var. *scopulorum*) ; dry, rocky ridges and prairies, or in northern California rarely in cold, wet swamps, reaching its greatest development along the western slope of the Sierras of northern and central California ; in western Washington and Oregon, rare and local ; next to *Pseudotsuga Douglasii* the most generally distributed and valuable timber tree of the Pacific forests, furnishing the principal lumber of eastern Washington and Oregon, western Montana, Idaho, the Black Hills of Dakota, western Texas, New Mexico, and Arizona.

Wood varying greatly in quality and value, heavy, hard, strong, brittle, not coarse-grained nor durable, compact ; bands of small summer cells broad or narrow, very resinous, conspicuous ; resin passages few, small ; medullary rays numerous, obscure ; color light red, the very thick sap-wood almost white ; largely manufactured into lumber, and used for railway-ties, fuel, etc.

362. *Pinus Jeffreyi*, Murr.

Bull Pine. Black Pine.

California, — Scott Mountains, south along the Sierra Nevada to the San Bernardino and San Jacinto Mountains.

A large tree, 30 to 31 metres in height, with a trunk 1.20 to 4 metres in diameter; dry, gravelly slopes between 6,000 and 8,000 feet elevation; most common and reaching its greatest development on the eastern slope of the Sierra Nevada.

Wood light, strong, hard, rather coarse-grained, compact; bands of small summer cells not broad, very resinous, conspicuous; resin passages few, not large; medullary rays numerous, obscure; color light red, the sap-wood pale yellow or nearly white; largely manufactured into coarse lumber.

Abietine, a volatile carbo-hydrogen possessing powerful anæsthetic properties, is obtained by distilling the resinous exudation of this species.

363. *Pinus Chihuahuana*, Engelm.

Santa Rita Mountains, Arizona, San Francisco Mountains, southwestern New Mexico and Arizona; in Chihuahua.

A small tree, 18 to 24 metres in height, with a trunk 0.45 to 0.60 metre in diameter; dry, rocky ridges and slopes between 5,000 and 7,000 feet elevation; not common.

Wood light, soft, strong, brittle, close-grained, compact; bands of small summer cells not broad, resinous, conspicuous; resin passages few, rather large, conspicuous; medullary rays numerous, thin; color clear light orange, the thick sap-wood lighter.

364. *Pinus contorta*, Dougl.

Scrub Pine.

Alaska, south along the coast to Mendocino County, California, extending inland to the western slopes of the Coast Ranges.

A small, stunted tree, 6 to 9 metres in height, with a trunk 0.30 to 0.50 metre in diameter; sandy dunes and exposed rocky points.

Wood light, hard, strong, brittle, coarse-grained; bands of small summer cells very broad, resinous, conspicuous; resin passages numerous, not large; medullary rays numerous, obscure; color light brown tinged with red, the thick sap-wood nearly white.

365. *Pinus Murrayana*, Balfour.

Tamarack. Black Pine. Lodge-pole Pine. Spruce Pine.

Valley of the Yukon River, Alaska, south through the interior of British Columbia, along the mountain ranges of Washington and Oregon and the Sierra Nevada of California to Mount San Jacinto; on the high plateau east of the Rocky Mountains in about latitude 56°, and south

through the mountains of Idaho, Montana, Wyoming, Colorado, and Utah to New Mexico and northern Arizona.

A tree 18 to 24 metres in height, with a trunk 0.60 to 1.20 metres in diameter; reaching its greatest development in the California Sierras; in the interior regions in dry, gravelly soil, here the prevailing tree, covering immense areas, and generally replacing other species destroyed by fire; western Washington and southward only along the borders of moist alpine meadows between 6,000 and 9,000 feet elevation.

Wood light, soft, not strong, close, straight-grained, easily worked, compact, not durable; bands of small summer cells narrow, not conspicuous; resin passages few, not large; medullary rays numerous, obscure; color light yellow or nearly white, the thin sap-wood lighter; occasionally manufactured into lumber, and used for fuel, railway-ties, etc.

366. *Pinus Sabiniana*, Dougl.

Digger Pine. Bull Pine.

California, — Shasta County, south along the foot-hills of the Coast Ranges and the western slope of the Sierra Nevada below 4,000 feet elevation.

A large tree, 24 to 30 metres in height, with a trunk 0.60 to 1.20 metres in diameter; very common through all the foot-hills region.

Wood light, soft, not strong, brittle, very coarse-grained, compact, not durable; bands of small summer cells broad, very resinous, conspicuous; resin passages few, large, prominent; medullary rays numerous, obscure; color light brown or red, the thick sap-wood yellow or nearly white; largely used for fuel.

The large seeds edible.

367. *Pinus Coulteri*, D. Don.

California, — Monte Diablo, south through the Coast Ranges to the Cuyamaca Mountains.

A tree 24 to 46 metres in height, with a trunk 0.90 to 1.80 metres in diameter; dry ridges and slopes between 3,000 and 6,000 feet elevation; most common and reaching its greatest development in the San Jacinto Mountains.

Wood light, soft, not strong, brittle, coarse-grained; bands of small summer cells broad, very resinous, conspicuous; resin passages few, large; medullary rays numerous, prominent; color light red, the thick sap-wood nearly white.

368. *Pinus insignis*, Dougl.

Monterey Pine.

California, — Pescadero to Monterey and San Simeon Bay.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; sandy soil, in immediate proximity to the sea-coast; rare and local.

Wood light, soft, not strong, brittle, close-grained, compact; bands of small summer cells not broad, resinous, conspicuous; color light brown, the very thick sap-wood nearly white; locally somewhat used for fuel.

369. *Pinus tuberculata*, Gord.

Knob-cone Pine.

Valley of the Mackenzie River, Oregon, south along the western slope of the Cascade and Sierra Nevada Mountains, and in the California Coast Ranges from the Santa Cruz to the San Jacinto Mountains.

A tree 18 to 22 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or, rarely, reduced to a low shrub; dry, gravelly ridges and slopes from 2,500 (San Bernardino Mountains) to 5,500 (Mount Shasta) feet elevation; not common.

Wood light, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells very broad, not conspicuous; resin passages numerous, large, prominent; medullary rays numerous, thin; color light brown, the thick sap-wood nearly white or slightly tinged with red.

370. *Pinus Tæda*, L.

Loblolly Pine. Old-field Pine. Rosemary Pine.

Southern Delaware, south to Cape Malabar and Tampa Bay, Florida, generally near the coast, through the Gulf States to the valley of the Colorado River, Texas, and extending north to the valley of the Arkansas River.

A tree 24 to 46 metres in height, with a trunk 0.90 to 1.50 metres in diameter; low, wet clay or dry, sandy soil; springing up on all abandoned lands from Virginia southward, and now often replacing in the Southern pine-belt the original forests of *Pinus palustris*; in eastern North Carolina rarely on low, rich swamp ridges, here known as rosemary pine and attaining its greatest development and value.

Wood light, not strong, brittle, very coarse-grained, not durable; bands of small summer cells broad, very resinous, conspicuous; resin passages few, not prominent; medullary rays numerous, obscure; color light brown, the very thick sap-wood orange, or often nearly white; largely used for fuel and manufactured into lumber of inferior quality.

371. *Pinus rigida*, Mill.

Pitch Pine.

New Brunswick to the northern shores of Lake Ontario, south through the Atlantic States to northern Georgia, extending to the western slope of the Alleghany Mountains in West Virginia and Kentucky.

A tree 12 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; dry, sandy, barren soil, or less commonly in deep, cold swamps; very common.

Wood light, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells broad, very resinous, conspicuous; resin passages numerous, not large; medullary rays numerous, obscure; color light brown or red, the thick sap-wood yellow or often nearly white; largely used for fuel, charcoal, and occasionally manufactured into coarse lumber.

372. *Pinus serotina*, Michx.

Pond Pine.

North Carolina, south near the coast to the head of the Saint John's River, Florida.

A tree 12 to 24 metres in height, with a trunk 0.60 to 0.90 metre in diameter; inundated borders of streams and ponds in low, peaty soil; not common.

Wood heavy, soft, not strong, brittle, coarse-grained, compact; bands of small summer cells broad, very resinous, dark-colored, conspicuous; resin passages few, large; medullary rays numerous, obscure; color dark orange, the thick sap-wood pale yellow.

373. *Pinus inops*, Ait.

Jersey Pine. Scrub Pine.

Long Island and Staten Island, New York, south, generally near the coast, to the valley of the Savannah River, South Carolina, and through eastern and middle Kentucky to southeastern Indiana.

A tree 24 to 36 metres in height, with a trunk 0.60 to 0.90 metre in diameter, or in the Atlantic States generally much smaller; sandy, generally barren soil, reaching its greatest development west of the Alleghany Mountains.

Wood light, soft, not strong, brittle, very close-grained, compact, durable; bands of small summer cells broad, very resinous, conspicuous; resin passages few, not prominent; medullary rays numerous, thin; color light orange, the thick sap-wood nearly white; largely used for fuel, and in Kentucky and Indiana preferred for and largely manufactured into water-pipes and pump-logs.

374. *Pinus clausa*, Vasey.

Sand Pine. Scrub Pine. Spruce Pine.

Florida, — shores of Pensacola Bay, south, generally within 30 miles of the coast, to Pease Creek, and occupying a narrow ridge along the east coast south of Saint Augustine.

A tree 21 to 24 metres in height, with a trunk 0.60 to 0.75 metre in diameter, or on the west coast rarely 6 to 9 metres in height; barren, sandy dunes and ridges; most common and reaching its greatest development about the head of Halifax Bay.

Wood light, soft, not strong, brittle ; bands of small summer cells broad, very resinous, conspicuous ; resin passages numerous, prominent ; medullary rays numerous, thin ; color light orange or yellow, the thick sap-wood nearly white.

375. *Pinus pungens*, Michx. f.

Table-mountain Pine. Hickory Pine.

Alleghany Mountains, Pennsylvania to Tennessee.

A tree 9 to 18 metres in height, with a trunk 0.60 to 1.05 metres in diameter ; most common and reaching its greatest development upon the high mountains of East Tennessee, here often forming extensive forests.

Wood light, soft, not strong, brittle, coarse-grained, compact ; bands of small summer cells broad, resinous, conspicuous ; resin passages numerous, large ; medullary rays numerous, prominent ; color light brown, the thick sap-wood nearly white ; in Pennsylvania largely manufactured into charcoal.

376. *Pinus muricata*, D. Don.

Obispo Pine. Bishop's Pine.

California. — Mendocino County south through the Coast Ranges to San Luis Obispo County.

A tree 24 to 36 metres in height, with a trunk 0.30 to 0.90 metre in diameter, or more often not exceeding 15 metres in height ; cold peat-bogs or barren, sandy gravel ; always in situations exposed to the winds and fogs of the ocean, and not found above 2,000 feet elevation, reaching its greatest development in Mendocino County ; rare and local.

Wood light, very strong and hard, rather coarse-grained, compact ; bands of small summer cells broad, resinous ; resin passages few, not prominent ; medullary rays numerous, thin ; color light brown, the thick sap-wood nearly white.

377. *Pinus mitis*, Michx.

Yellow Pine. Short-leaved Pine. Spruce Pine. Bull Pine.

Staten Island, New York, south to western Florida, through the Gulf States to Tennessee and eastern Texas, and through Arkansas to the Indian Territory, southeastern Kansas, southern Missouri and southern Illinois.

A tree 24 to 30 metres in height, with a trunk 0.60 to 1.35 metres in diameter ; light, sandy soil or, less commonly, along the low borders of swamps ; forming, west of the Mississippi River, mixed with oaks and other deciduous trees, extensive forests ; the only species of northern Arkansas, Kansas, and Missouri, and reaching its greatest development in western Louisiana, southern Arkansas and eastern Texas.

Wood varying greatly in quality and amount of sap, heavy, hard, strong, generally coarse-grained, compact; bands of small summer cells broad, very resinous; resin passages numerous, large; medullary rays numerous, conspicuous; color orange, the sap-wood nearly white; largely manufactured into lumber, especially in the States west of the Mississippi River.

378. *Pinus glabra*, Walt.

Cedar Pine. Spruce Pine. White Pine.

South Carolina, south to middle Florida, generally near the coast, and through the Gulf States south of latitude 32° 30' to the valley of the Pearl River, Louisiana.

A tree 24 to 30 metres in height, with a trunk 0.60 to 1.20 metres in diameter; rich bottom-lands and hummocks in dense forests of hard-wood trees, reaching its greatest development in Alabama and Mississippi; not common and very local.

Wood light, soft, not strong, brittle, very coarse-grained, not durable; bands of small summer cells broad, not resinous; resin passages few, not large; medullary rays numerous, obscure; color light brown, the sap-wood nearly white.

379. *Pinus Banksiana*, Lamb.

Gray Pine. Scrub Pine. Prince's Pine.

Bay of Chaleur to the southern shores of Hudson Bay, northwest to the Great Bear Lake, the valley of the Mackenzie River, and the eastern slope of the Rocky Mountains; south to northern Maine, northern Vermont, the southern shores of Lake Michigan and central Minnesota.

A small tree, 9 to 22 metres in height, with a trunk rarely exceeding 0.75 metre in diameter; barren, sandy soil or, less commonly, in rich loam; most common north of the boundary of the United States, and reaching its greatest development in the region north of Lake Superior, here often forming considerable forests; toward its extreme western limits associated and often confounded with the closely allied *P. contorta* and *P. Murrayana* of the Pacific region.

Wood light, soft, not strong, rather close-grained, compact; bands of small summer cells not broad, very resinous, conspicuous; resin passages few, not large; medullary rays numerous, obscure; color clear light brown or, rarely, orange, the thick sap-wood almost white; largely used for fuel, railway-ties, etc.

380. *Pinus palustris*, Mill.

Long-leaved Pine. Southern Pine. Georgia Pine. Yellow Pine. Hard Pine.

Southeastern Virginia, south to Cape Canaveral and Tampa Bay, Florida, and through the Gulf States to the valley of the Red River,

Louisiana, and the Trinity River, Texas, rarely extending beyond 150 miles from the coast.

A tree 18 to 29 metres in height, with a trunk 0.60 to 1.20 metres in diameter; dry, sandy loam of the maritime plain; forming extensive forests almost to the exclusion of other species, or toward its extreme interior range, especially in the Gulf States, occupying rolling hills, here mixed with oaks and various deciduous trees; rarely along the borders of swamps in low, wet soil.

Wood heavy, exceedingly hard, very strong, tough, coarse-grained, compact, durable; bands of small summer cells broad, very resinous, dark-colored; resin passages few, not conspicuous; medullary rays numerous, conspicuous; color light red or orange, the thin sap-wood nearly white; largely manufactured into lumber and used in construction of all sorts, for ship-building, fencing, railway-ties, etc.

The turpentine, tar, pitch, rosin, and spirits of turpentine manufactured in the United States are almost exclusively produced by this species.

381. *Pinus Cubensis*, Griseb.

Slash Pine. Swamp Pine. Bastard Pine. Meadow Pine.

South Carolina, south near the coast to the southern keys of Florida, west along the Gulf coast to the valley of the Pearl River, Louisiana, not extending beyond 50 or 60 miles inland; in the West Indies.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; light, sandy soil along the dunes and marshes of the coast, or wet, clay borders of ponds, abandoned fields, etc., and now rapidly taking possession of ground from which the forests of *P. palustris* have been removed; the only species of Florida south of Cape Canaveral and Bay Biscayne.

Wood heavy, exceedingly hard, very strong, tough, coarse-grained, compact, durable; bands of small summer cells very broad and resinous, conspicuous; resin passages few, not large; medullary rays numerous, rather prominent; color rich dark orange, the sap-wood lighter, often nearly white; hardly inferior in value to that of *P. palustris*, although rarely manufactured into lumber.

Turpentine is occasionally manufactured in southern Florida from this species.

382. *Picea nigra*, Link.

Black Spruce.

Newfoundland, northern Labrador to Ungava Bay, Nastapokee Sound and Cape Churchill, Hudson Bay, and northwest to the mouth of the Mackenzie River and the eastern slopes of the Rocky Mountains; south through the Northern States to Pennsylvania, central Michigan, central

Wisconsin and Minnesota, and along the Alleghany Mountains to the high peaks of North Carolina.

A tree 15 to 21 metres in height, with a trunk 0.60 to 0.90 metre in diameter; light, dry, rocky soil, forming, especially north of latitude 50°, extensive forests on the water-sheds of the principal streams or in cold, wet swamps; then small, stunted, and of little value (*P. rubra*).

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells thin, resinous; resin passages few, minute; medullary rays few, conspicuous; color light red or often nearly white, the sap-wood lighter; largely manufactured into lumber, and used in construction, for ship-building, piles, posts, railway-ties, etc.

383. *Picea alba*, Link.

White Spruce.

Newfoundland, northern shore of Labrador to Ungava Bay, Cape Churchill, and northward to the mouth of the Mackenzie River and the valley of the Yukon River, Alaska; south to northern Maine, north-eastern Vermont, northern Michigan and Minnesota, the Black Hills of Dakota, the Rocky Mountains of northern Montana, Sitka, and British Columbia.

A tree 15 to 50 metres in height, with a trunk 0.60 to 0.90 metre in diameter; low, rather wet soil, borders of ponds and swamps; most common north of the boundary of the United States, and reaching its greatest development along the streams and lakes of the Flathead region of northern Montana at an elevation of 2,500 to 3,500 feet; the most important timber tree of the American subarctic forests north of latitude 60°; its distribution southward in British Columbia not yet satisfactorily determined.

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells thin, not conspicuous; resin passages few, minute; medullary rays numerous, prominent; color light yellow, the sap-wood hardly distinguishable; largely manufactured into lumber, although not distinguished in commerce from that of the black spruce (*P. nigra*).

384. *Picea Engelmanni*, Engelm.

White Spruce.

Peace River Plateau, in latitude 55° 46', through the interior of British Columbia and along the Cascade Mountains of Washington and Oregon to the valley of the Mackenzie River; on the principal ranges of the Rocky and Wahsatch Mountains to the San Francisco Mountains, Sierra Blanco, and Mount Graham, Arizona.

A large tree, 24 to 46 metres in height, with a trunk 0.90 to 1.20 metres in diameter, or at its extreme elevation reduced to a low, prostrate shrub; dry, gravelly slopes and ridges between 5,000 and 11,500 feet elevation; the most valuable timber tree of the central Rocky Mountain

region, here forming extensive forests, generally above 8,500 feet elevation; rare and of small size in the mountains of Washington, Oregon, and Montana.

Wood very light, soft, not strong, very close, straight-grained, compact, satiny; bands of small summer cells narrow, not conspicuous; resin passages few, minute; medullary rays numerous, conspicuous; color pale yellow tinged with red, the sap-wood hardly distinguishable; in Colorado manufactured into lumber and largely used for fuel, charcoal, etc.

The bark, rich in tannin, is sometimes used in Utah in tanning leather.

385. *Picea pungens*, Engelm.

White Spruce. Blue Spruce.

Valley of the Wind River, south in the mountain ranges of Wyoming, Colorado, and Utah.

A tree 30 to 46 metres in height, with a trunk 0.60 to 0.90 metre in diameter; borders of streams, in damp or wet soil, generally between 6,000 and 9,000 feet elevation, never forming forests; rare and local.

Wood very light, soft, weak, close-grained, compact, satiny; bands of small summer cells narrow, not conspicuous; resin passages few, small; medullary rays numerous, prominent; color very light brown or often nearly white, the sap-wood hardly distinguishable.

386. *Picea Sitchensis*, Carr.

Tide-land Spruce.

Alaska, south to Mendocino County, California, not extending more than 50 miles inland from the coast.

A large tree of great economic value, 46 to 61 metres in height, with a trunk 2.40 to 5.19 metres in diameter; gravelly ridges and swamps, reaching its greatest development in Washington and Oregon near the mouth of the Columbia River, here forming a belt of nearly continuous forest growth, from 10 to 50 miles in width.

Wood light, soft, not strong, close, straight-grained, compact, satiny; bands of small summer cells narrow, not conspicuous; resin passages few, obscure; medullary rays numerous, rather prominent; color light brown tinged with red, the sap-wood nearly white; largely manufactured into lumber and used for construction, interior finish, fencing, boat-building, the dunnage of vessels, cooperage, wooden-ware, etc.

386 a. *Picea* species.

Alpine slopes of the Siskiyou Mountains, Oregon (*Thomas Howell*, June, 1884); probably very rare and local.

A tree sometimes exceeding 30 metres in height, with a trunk often 1 metre in diameter; the botanical characters not yet published; easily dis-

tinguished by its long pendulous branchlets, flat or slightly rounded leaves, and large cones with broad, spreading, very thin, entire scales.

Wood not collected.

387. *Tsuga Canadensis*, Carr.

Hemlock.

Nova Scotia, southern New Brunswick, valley of the Saint Lawrence River to the shores of Lake Temiscaming, and southwest to the western borders of northern Wisconsin; south through the Northern States to northern Delaware, southeastern Michigan, central Wisconsin, and along the Alleghany Mountains to northern Alabama.

A tree 21 to 33 metres in height, with a trunk 0.90 to 1.15 metres in diameter; dry, rocky ridges, generally facing the north and often forming extensive forests almost to the exclusion of other species, or, less commonly, borders of swamps in deep, rich soil; most common at the North, and reaching its greatest individual development in the high mountains of North Carolina and Tennessee.

Wood light, soft, not strong, brittle, coarse, crooked-grained, difficult to work, liable to wind-shake and splinter, not durable; bands of small summer cells rather broad, conspicuous; medullary rays numerous, thin; color light brown tinged with red or often nearly white, the sap-wood somewhat darker; largely manufactured into coarse lumber and used in construction for outside finish, railway-ties, etc.; two varieties, red and white, produced apparently under precisely similar conditions of growth, are recognized by lumbermen.

The bark, rich in tannin, is the principal material used in the Northern States in tanning leather, and yields a fluid extract sometimes used medicinally as a powerful astringent.

388. *Tsuga Caroliniana*, Engelm.

Hemlock.

Southern Alleghany region, North and South Carolina.

A small tree, 12 to 15 metres in height, with a trunk 0.60 to 0.75 metre in diameter; dry, rocky ridges between 4,000 and 5,000 feet elevation; rare and local.

Wood light, soft, not strong, brittle, coarse-grained; bands of small summer cells narrow, not conspicuous; medullary rays numerous, thin; color light brown tinged with red, the sap-wood nearly white.

389. *Tsuga Mertensiana*, Carr.

Hemlock.

Alaska, south along the islands and coast of British Columbia, and through the Selkirk, Gold, and other interior ranges to the Bitter Root Mountains of Idaho, and the western slopes of the Rocky Mountains of

Montana, extending south along the Cascade Mountains to southern Oregon and in the Coast Ranges between 1,000 and 4,000 feet elevation, to northern California.

A large tree, 30 to 61 metres in height, with a trunk 1.20 to 3 metres in diameter; low, moist bottoms or rocky ridges; very common and reaching its greatest development in western Oregon and Washington, often forming extensive forests, especially along the western base of the Cascade Mountains.

Wood light, hard, not strong, rather close-grained; bands of small summer cells thin, not conspicuous; medullary rays numerous, prominent; color light brown tinged with yellow, the sap-wood nearly white; occasionally manufactured into coarse lumber.

The bark, rich in tannin, is the principal material used on the north-west coast in tanning leather.

390. *Tsuga Pattoniana*, Engelm.

British Columbia, south along the Cascade Mountains and the California Sierras to the headwaters of the San Joaquin River, extending east along the high mountains of northern Washington to the western slopes and summits of the Cœur d'Alêne and Bitter Root Mountains of Idaho, and to northern Montana.

An alpine tree, rarely 30 metres in height, with a trunk 1.50 to 2.10 metres in diameter; dry slopes and ridges near the limits of tree growth, ranging from an elevation of 2,700 feet in British Columbia to 10,000 feet on the Sierras of central California.

Wood light, soft, not strong, close-grained, satiny, susceptible of a good polish; bands of small summer cells thin, not conspicuous; medullary rays numerous, obscure; color light brown or red, the sap-wood nearly white.

391. *Pseudotsuga Douglasii*, Carr.

Red Fir. Yellow Fir. Oregon Pine. Douglas Fir.

Coast Ranges and interior plateau of British Columbia south of latitude 55° N., east to the eastern slope of the Rocky Mountains in latitude 51° N.; south along the mountain ranges of Washington, Oregon, the California Coast Ranges, and the western slope of the Sierra Nevada, on the mountain ranges east to Montana, Wyoming, Colorado, and the Guadalupe Mountains of Texas; in the Wahsatch and Uintah Mountains, the ranges of northern and eastern Arizona; in northern Mexico; not detected in the interior region between the Sierra Nevada and the Wahsatch Mountains, south of the Blue Mountains of Oregon, and north of Arizona.

A large tree, 61 to 92 metres in height, with a trunk 0.83 to 3.66 metres in diameter, or in the Rocky Mountains much smaller, here rarely

30 metres in height; the most generally distributed and valuable timber tree of the Pacific region, growing from the sea-level to an elevation in Colorado of nearly 10,000 feet; often forming extensive forests, almost to the exclusion of other species, and reaching in western Oregon and Washington Territory its greatest development and value. A form with larger cones and narrower acutish leaves (var. *macrocarpa*, Engelm.) occurs in the San Bernardino and Cuyamaca Mountains of southern California, — a small tree with darker-colored, lighter, and less valuable wood.

Wood hard, strong, varying greatly with age and conditions of growth in density, quality, and amount of sap; difficult to work, durable; bands of small summer cells broad, occupying fully one half the width of the annual growth, dark-colored, conspicuous, soon becoming flinty and difficult to cut; medullary rays numerous, obscure; color varying from light red to yellow, the sap-wood nearly white; largely manufactured into lumber and used for all kinds of construction, railway-ties, piles, fuel, etc. Two varieties, red and yellow fir, distinguished by lumbermen, are dependent probably upon the age of the tree; the former coarse-grained, darker-colored, and considered less valuable than yellow fir.

The bark has proved valuable in tanning leather.

392. *Abies Fraseri*, Lindl.

Balsam. She Balsam.

High Mountains of North Carolina and Tennessee.

A tree 18 to 24 metres in height, with a trunk sometimes 0.60 metre in diameter; moist slopes between 5,000 and 6,500 feet elevation, often forming considerable forests; very local.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells rather broad, light-colored, not conspicuous; medullary rays numerous, thin; color light brown, the sap-wood lighter, nearly white.

393. *Abies balsamea*, Mill.

Balsam Fir. Balm-of-Gilead Fir.

Northern Newfoundland and Labrador to the southern shores of Hudson Bay; northwest to the Great Bear Lake and the eastern base of the Rocky Mountains; south through the Northern States to Pennsylvania, central Michigan and Minnesota, and along the Alleghany mountains to the high peaks of Virginia.

A tree 21 to 27 metres in height, with a trunk rarely exceeding 0.60 metre in diameter, or at high elevations reduced to a low, prostrate shrub (*A. Hudsonica*, Hort.); damp woods and mountain swamps.

Wood very light, soft, not strong, coarse-grained, compact, not durable; bands of small summer cells not broad, resinous, conspicuous; medullary rays numerous, obscure; color light brown, often streaked with yellow, the sap-wood lighter.

Canadian balsam or balm of fir, an aromatic liquid oleo-resin obtained from this and other species of *Abies* by puncturing the vesicles formed under the bark of the stem and branches, is used medicinally, chiefly in the treatment of chronic catarrhal affections, and in the arts.

394. *Abies subalpina*, Engelm.

Balsam.

Alaska, south through British Columbia and along the Cascade Mountains to northern Oregon; Blue Mountains of Oregon and on the ranges of Idaho, Montana, Wyoming, Utah, and Colorado.

A tree 24 to 40 metres in height, with a trunk rarely exceeding 0.60 metre in diameter; mountain slopes and cañons between 4,000 (British Columbia) and 12,000 (Colorado) feet elevation; generally scattered and rarely forming the prevailing forest growth.

Wood very light, soft, not strong, rather close-grained, compact; bands of small summer cells very narrow, not conspicuous; medullary rays numerous, obscure; color light brown or nearly white, the sap-wood lighter.

395. *Abies grandis*, Lindl.

White Fir.

Vancouver's Island, south to northern California, near the coast; interior valleys of western Washington and Oregon south to the Umpqua River; Cascade Mountains below 4,000 feet elevation, Blue Mountains of Oregon to the eastern slope of the Cœur d'Alène and Bitter Root Mountains, Idaho, and the western slopes of the Rocky Mountains of northern Montana.

A large tree, 61 to 92 metres in height, with a trunk 0.90 to 1.50 metres in diameter; most common and reaching its greatest development on the bottom-lands of western Washington and Oregon in rich, moist soil or on moist mountain slopes; then much smaller, rarely exceeding 30 metres in height.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells broader than in other American species, dark-colored, resinous, conspicuous; medullary rays numerous, obscure; color light brown, the sap-wood rather lighter; in western Oregon manufactured into lumber and used for interior finish, packing-cases, cooperage, etc.

396. *Abies concolor*, Lindl. & Gord.

White Fir. Balsam Fir.

Northern slopes of the Siskiyou Mountains, Oregon, south along the western slope of the Sierra Nevada to the San Bernardino and San Jacinto Mountains, California; high mountains of northern Arizona to the

Mogollon Range, New Mexico, northward to the Pike's Peak region of Colorado, and in the Wahsatch Mountains of Utah.

A large tree, 30 to 40 metres in height, with a trunk 1.20 to 1.50 metres in diameter; moist slopes and cañons between 3,000 and 9,000 feet elevation, reaching its greatest development in the California Sierras, varying greatly in the color and length of leaves, habit, etc., and perhaps only a southern form of the too nearly allied *A. grandis*, from which it cannot be always readily distinguished.

Wood very light, soft, not strong, coarse-grained, compact; bands of small summer cells narrow, resinous, not conspicuous; medullary rays numerous, obscure; color very light brown or nearly white, the sap-wood somewhat darker; occasionally manufactured into lumber and used for packing-cases, butter-tubs, and other domestic purposes.

397. *Abies bracteata*, Nutt.

California, — Santa Lucia Mountains.

A tree 46 to 61 metres in height, with a trunk 0.90 to 1.20 metres in diameter; moist, cold soil, occupying 4 or 5 cañons between 3,000 and 6,000 feet elevation, west of the summit of the range.

Wood heavy, not hard, coarse-grained, compact; bands of small summer cells broad, resinous, conspicuous; medullary rays numerous, obscure; color light brown tinged with yellow, the sap-wood not seen.

398. *Abies amabilis*, Forbes.

Valley of the Fraser River, British Columbia, south along the Cascade Mountains of Washington and Oregon.

A tree 30 to 45 metres in height, with a trunk sometimes 1.20 metres in diameter, forming extensive forests on the mountains of British Columbia between 3,500 and 5,000 feet, and upon the mountains south of the Columbia River between 3,000 and 4,000 feet elevation, here reaching its greatest development; its northern range not yet determined.

Wood light, hard, not strong, close-grained, compact; bands of small summer cells broad, resinous, dark-colored, conspicuous; medullary rays numerous, thin; color light brown, the sap-wood nearly white.

399. *Abies nobilis*, Lindl.

Red Fir.

Oregon, — Cascade Mountains from the Columbia River south to the valley of the upper Rogue River, summits of the Coast Range from the Columbia to the Nestucca River.

A large tree, 61 to 92 metres in height, with a trunk 2.40 to 3 metres in diameter, forming, with *A. amabilis*, extensive forests along the slopes of the Cascade Range, between 3,000 and 4,000 feet elevation; less multiplied in the Coast Ranges, but here reaching its greatest individual development.

Wood light, hard, strong, rather close-grained, compact; bands of small summer cells broad, resinous, dark-colored, conspicuous; medullary rays thin, hardly distinguishable; color light brown streaked with red, the sap-wood a little darker.

400. *Abies magnifica*, Murr.

Red Fir.

California, — Mount Shasta, south along the western slope of the Sierra Nevada to Kern County.

A large tree, 61 to 76 metres in height, with a trunk 2.40 to 3 metres in diameter, forming about the base of Mount Shasta extensive forests between 4,900 and 8,000 feet elevation; in the southern sierras less common, here reaching an extreme elevation of 10,000 feet.

Wood light, soft, not strong, rather close-grained, compact, satiny, durable in contact with the soil, liable to twist and warp in seasoning; bands of small summer cells broad, resinous, dark-colored, conspicuous; medullary rays numerous, thin; color light red, the sap-wood somewhat darker; largely used for fuel and occasionally manufactured into coarse lumber.

401. *Larix Americana*, Michx.

Larch. Black Larch. Tamarack. Hackmatack.

Northern Newfoundland and Labrador to the eastern shores of Hudson Bay, Cape Churchill, and northwest to the northern shores of the Great Bear Lake and the valley of the Mackenzie River within the Arctic Circle; south through the Northern States to northern Pennsylvania, northern Indiana and Illinois, and central Minnesota.

A tree 24 to 30 metres in height, with a trunk 0.60 to 0.90 metre in diameter; moist uplands and intervale lands, or, south of the boundary of the United States, in cold, wet swamps, often covering extensive areas, here much smaller and less valuable.

Wood heavy, hard, very strong, rather coarse-grained, compact, durable in contact with the soil; bands of small summer cells broad, very resinous, dark-colored, conspicuous; resin passages few, obscure; medullary rays numerous, hardly distinguishable; color light brown, the sap-wood nearly white; preferred and largely used for the upper knees of vessels, for ship-timbers, fence-posts, telegraph-poles, railway-ties, etc.

402. *Larix occidentalis*, Nutt.

Tamarack.

British Columbia, Selkirk and Gold Ranges, south of latitude 53°, south along the eastern slopes of the Cascade Mountains to the Columbia River, through the mountain ranges of northern Washington Territory to the western slopes of the Rocky Mountains of Montana; Blue Mountains of Washington and Oregon.

A large tree, 30 to 45 metres in height, with a trunk 0.90 to 1.50 metres in diameter; moist mountain slopes and benches between 2,500 and 5,000 feet elevation; scattered among other trees and never exclusively forming forests; very common and perhaps reaching its greatest development in the region north of the Big Blackfoot River and in the valley of the Flathead River, Montana; the largest and most valuable timber tree of the Columbian basin.

Wood heavy, exceedingly hard and strong, rather coarse-grained, compact, satiny, susceptible of a fine polish, very durable in contact with the soil; bands of small summer cells broad, very resinous, dark-colored, conspicuous; resin passages few, obscure; medullary rays numerous, thin; color light bright red, the thin sap-wood nearly white; occasionally manufactured into lumber, but principally used for fuel, posts, railway-ties, etc.

403. *Larix Lyallii*, Parl.

Eastern slope of the Cascade Mountains of northern Washington, east along the boundary of the United States to northern Montana.

A low, much-branched, straggling, alpine tree, rarely exceeding 15 metres in height, with a trunk sometimes 1.50 metres in diameter; dry, rocky soil, generally upon northern exposures, and associated with *Pinus albicaulis* and *Tsuga Pattoniana* along the upper limits of tree growth between 5,500 and 7,000 feet elevation.

PALMÆ.

404. *Sabal Palmetto*, Lodd.

Cabbage Tree. Cabbage Palmetto.

North Carolina, south along the coast to Key Largo, Florida, extending along the Gulf coast to the Apalachicola River.

A tree 7 to 12 metres in height, with a trunk 0.60 to 0.90 metre in diameter; sandy maritime shores; very common and reaching its greatest development upon the west coast of the Florida peninsula south of Cedar Keys.

Wood light, soft; fibro-vascular bundles hard, difficult to work, dark-colored; color light brown; impervious to the attacks of the *Teredo*, and largely used for wharf-piles, etc.

405. *Washingtonia filifera*, Wend.

Fan-leaf Palm.

California, — from the eastern base of the San Bernardino Mountains to the valley of the Colorado River.

A tree 12 to 18 metres in height, with a trunk 0.60 to 1.05 metres in diameter, forming groves of 250 to 500 plants in the depressions of the

desert, in moist alkaline soil, or solitary and scattered near the heads of small ravines formed by watercourses; often stunted and greatly injured by fire.

Wood light, soft; fibro-vascular bundles hard, difficult to cut, dark-colored, conspicuous.

406. *Thrinax parviflora*, Sw.

Silk-top Palmetto.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, 9 metres in height, with a trunk rarely exceeding 0.10 metre in diameter, or in pine-barren soil often low and stemless (*P. Garberi*, Chapm.).

Wood light, soft; fibro-vascular bundles small, hard, not conspicuous; color light brown; the trunk used in making sponge- and turtle-crawls.

407. *Thrinax argentea*, Lodd.

Silver-top Palmetto. Brickley Thatch. Brittle Thatch.

Southern keys of semi-tropical Florida; in the West Indies.

A small tree, 7 to 9 metres in height, with a trunk 0.15 to 0.20 metre in diameter.

Wood light, soft; fibro-vascular bundles small, very numerous; interior of the trunk spongy, much lighter than the exterior; used for piles, the foliage in the manufacture of ropes, for thatch, etc.

408. *Oreodoxa regia*, HBK.

Royal Palm.

Semi-tropical Florida, — hummocks near Cape Romano to the southern keys; in the West Indies.

A tree 18 to 30 metres in height, with a trunk 0.60 metre in diameter; rich hummocks, often forming extensive groves; in Florida rare and local.

Wood heavy, hard; fibro-vascular bundles large, very dark, conspicuous; interior of the trunk spongy, much lighter than the exterior; color brown.

LILIACEÆ.

409. *Yucca canaliculata*, Hook.

Spanish Bayonet.

Texas, — Matagorda Bay, and from the Brazos and Guadalupe Rivers to the Rio Grande; in northern Mexico.

A small tree, 5 to 8 metres in height, with a trunk 0.30 to 0.75 metre in diameter; dry, gravelly, arid soil.

Wood, like that of the whole genus, showing distinct marks of concentric arrangement, fibrous, spongy, heavy, difficult to cut and work; color light brown.

The bitter, sweetish fruit is cooked and eaten by the Mexicans; the root stock, as in the whole genus, is saponaceous and largely used by the Mexicans as a substitute for soap.

410. *Yucca brevifolia*, Engelm.

The Joshua. Joshua Tree.

Southwestern Utah, northwestern Arizona to southern Nevada, and the valley of the Mohave River, California.

A tree 6 to 12 metres in height, with a trunk 0.60 to 0.90 metre in diameter; dry, gravelly soil; forming upon the Mohave Desert, at 2,500 feet elevation, an open, straggling forest.

Wood light, soft, spongy, difficult to work; color very light brown or nearly white; sometimes manufactured into paper-pulp.

411. *Yucca elata*, Engelm.

Western Texas to southern Arizona and Utah; southward into Mexico.

A small tree, 3 to 5 metres in height, with a trunk 0.20 to 0.25 metre in diameter; dry, gravelly slopes.

Wood light, soft, spongy; color light brown or yellow.

412. *Yucca baccata*, Torr.

Spanish Bayonet. Mexican Banana.

Western Texas, south of latitude 32° N., west through New Mexico to southern Colorado and southern California; in northern Mexico.

A tree 7 to 12 metres in height, with a trunk 0.60 metre in diameter, or often much smaller, and toward the northern limits of its range stemless; forming upon the plains of Presidio County, Texas, extensive open forests.

Wood light, soft, spongy, difficult to work; color light brown.

The large juicy edible fruit is an important article of food to Mexicans and Indians; a strong coarse fibre, prepared by macerating the leaves in water, is manufactured into rope in Mexico.

THE PHYSICAL PROPERTIES
OF THE
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THE various processes by which the physical properties of the woods of the United States were determined by Mr. Sharples, in connection with the Census investigation, are fully set forth in Vol. IX. of the final Reports of the Tenth Census. This volume may not be accessible to all persons who may have occasion to use the following tables, and the methods therefore adopted in attaining these results are here briefly described.

The specific gravity, ash, and fuel value of the wood of every indigenous arborescent species of the United States, with seven unimportant exceptions, were determined. The specific gravity was obtained by weighing carefully measured specimens, 100 millimetres long and about 35 millimetres square, previously subjected to a temperature of 100° C. until their weight became constant. The ash is given in percentages of the dry wood, and was determined by burning small blocks of the wood in a muffle furnace at a low temperature.

The relative approximate fuel value of any wood is obtained by deducting its percentage of ash from its specific gravity; and the correctness of the result thus obtained is based upon the hypothesis first proposed by Count Rumford, that the value of equal weights of all woods for fuel is the same. It would be more correct, however, to say that the fuel value of the organic matter in all woods is approximately the same.

Wood is made up of two factors, — organic matter, composed of carbon, hydrogen, and oxygen, with a small amount of nitrogen, and a still smaller amount of sulphur; and inorganic or mineral matter, — ash, as it is generally called, — without value as fuel. The specific gravity represents the weight of equal volumes of wood; and if from the specific gravity the weight of the ash, which varies greatly in different species, is deducted,

the relative fuel value will be obtained. A wood free from ash, therefore, having the specific gravity of 1.000, would represent the unit of fuel value, the specimens being free from hygroscopic water.

If the values thus obtained are multiplied by 4,000, the results will give very nearly, except in the case of some of the resinous woods, the number of units of heat which a cubic decimetre of the wood is capable of yielding, — a unit of heat being the amount required to raise one kilogramme of water one degree Centigrade. The fuel value of any wood is often modified by other conditions than its weight and percentage of ash. Perfect combustion is rarely attainable. Resinous woods, especially, are seldom perfectly consumed, much carbon escaping in the form of smoke. The moisture which always occurs in the firewood of commerce must also be considered. Wood when first cut often contains as much as 50 per cent of its weight of water, and air-dried wood may generally be expected to contain at least 20 per cent. The heat necessary to distil this is, of course, lost in combustion.

The strength and power to resist compression of the principal timbers produced in the forests of the United States were determined by Mr. Sharples in the course of the Census investigation.

A stick being supported at each end and weights being applied to it, it is bent or deflected in proportion to each addition of weight within a certain limit, which differs in different species of wood. This limit is called the elastic limit of the wood. When the elastic limit is exceeded, the ratio of deflection is in excess of that previously produced by the addition of similar weight. If the elasticity of a given stick under weights which do not strain it beyond this limit is known, the deflection of any other stick, of the same wood, may be calculated by means of the following formula : —

$$E = \frac{Pl^3}{4\Delta bd^3}.$$

E is the coefficient of elasticity ; P , the weight applied in kilogrammes ; l , the length of the stick in centimetres ; b , the width of the stick in centimetres ; d , the depth of the stick in centimetres ; Δ , its deflection in centimetres.

Any five of these being known, the value of the sixth may be calculated. E has been determined for many woods, and its value is given in the fourth column of Table I.

If the deflection of a stick under a given weight is required, it can be obtained by using the formula

$$\Delta = \frac{Pl^3}{4Ebd^3}.$$

It is often desirable to know what is the ultimate strength of a given stick. This is obtained by the following formula:—

$$R = \frac{3Pl}{2bd^2},$$

in which P , l , b , and d have the same value as in the preceding formulas. R is given in the fifth column of Table I. as the Modulus of Rupture. In this formula P will most generally be the unknown quantity, and can be obtained by using this formula, —

$$P = \frac{2bd^2R}{3l}.$$

Wood may be compressed in a direction either parallel or perpendicular to its fibres. The latter is known as indentation. When a stick is compressed in the direction parallel to its fibres, if its length does not exceed ten or twelve times its diameter, it generally fails by the crushing of the fibres; and the force necessary to produce such crushing is proportionate to the area of the cross-section of the stick. The figures in the sixth column of Table I. give the weight in kilogrammes necessary to produce such crushing in sticks of the different species one centimetre square. In order to find the weight any given stick will support, the number in the column should be multiplied by the number of square centimetres in the end of the stick. The force necessary to sink a punch one centimetre square to the depth of 1.27 millimetres perpendicular to the fibre of the wood of the different species, is given in the seventh column of Table I. The force necessary to produce indentation is proportionate to the surface of the punch or the surface exposed to its action.

For further information in regard to the formulas relating to the physical properties of wood, the reader is referred to:—

The Materials of Engineering. Part I. pp. 37–153. Robert H. Thurston. New York, 1883.

Treatise on the Resistance of Materials. De Volson Wood. New York, 1871.

TABLE I.

Specific Gravity, Percentage of Ash, Relative Approximate Fuel Value, Coefficient of Elasticity, Modulus of Rupture, Resistance to Pressure, and Weight per Cubic Foot of the Woods of the United States.

Catalogue Number.	Species.	Specific Gravity.	Percentage of Ash.	Relative Approximate Fuel Value.	Coefficient of Elasticity.	Modulus of Rupture.	Resistance to Longitudinal Pressure.	Resistance to Indentation.	Weight of a Cubic Foot in Pounds.
1	Magnolia grandiflora	0.6300	0.53	0.6326	00330	792	482	197	30.64
2	Magnolia glauca	0.5035	0.47	0.5011	91299	736	424	102	31.38
3	Magnolia acuminata	0.4690	0.29	0.4676	92817	671	416	107	29.23
4	Magnolia cordata	0.4139	0.32	0.4126	94073	600	410	89	25.78
5	Magnolia macrophylla	0.5309	0.35	0.5290	116864	696	489	130	33.09
6	Magnolia Umbrella	0.4487	0.20	0.4478	74365	583	366	84	27.96
7	Magnolia Fraseri	0.5003	0.28	0.4989	94402	707	418	123	31.18
8	Liriodendron Tulipifera	0.4230	0.23	0.4220	92667	657	372	82	26.36
9	Asimina triloba	0.3969	0.21	0.3961	48179	391	212	69	24.73
10	Anona laurifolia	0.5053	4.88	0.4807	60113	607	302	127	31.49
11	Capparis Jamaicensis	0.6971	4.76	0.6639	43.44
12	Canella alba	0.9893	1.75	0.9720	111698	1026	782	573	61.65
13	Clusia flava
14	Gordonia Lasianthus	0.4728	0.76	0.4692	79414	670	387	90	29.46
15	Gordonia pubescens
16	Fremontia Californica	0.7142	1.60	0.7021	44.50
17	Tilia Americana	0.4525	0.55	0.4500	84010	589	348	63	28.20
17 ¹	Tilia Americana, var. pubescens	0.4074	0.65	0.4048	81111	560	405	59	25.39
18	Tilia heterophylla	0.4253	0.62	0.4227	84659	577	394	68	26.50
19	Byrsonima lucida	0.5888	2.46	0.5743	62503	424	391	210	36.69
20	Guaiacum sanctum	1.1432	0.82	1.1338	86324	787	737	793	71.24
21	Portiera angustifolia	1.1101	0.51	1.1044	69.18
22	Xanthoxylum Americanum	0.5634	0.57	0.5622	35.24
23	Xanthoxylum Clava-Herculis	0.5056	0.82	0.5015	72577	640	440	159	31.51
23 ¹	Xanthoxylum Clava-Herculis, var. fruticosum	0.5067	0.76	0.5022	31.19
24	Xanthoxylum Caribæum	0.9002	2.02	0.8820	86765	764	685	373	56.00
25	Xanthoxylum Pterota	0.7444	0.78	0.7366	46.39
26	Ptelea trifoliata	0.8319	0.30	0.8294	51.84
27	Canotia holacantha	0.6885	5.33	0.6518	42.91
28	Simariba glauca	0.4186	0.93	0.4098	93217	564	426	88	25.78
29	Bursera gummiifera	0.8003	2.04	0.2942	41694	148	156	47	18.71
30	Amyris sylvatica	1.0459	0.59	1.0397	108507	1305	748	550	65.18
31	Swietenia Mahagoni	0.7282	1.09	0.7203	106272	1003	666	309	45.38
32	Ximenia Americana	0.9196	0.78	0.9129	57.31
33	Ilex opaca	0.5818	0.76	0.5774	64317	666	419	176	36.26
34	Ilex Dahoon	0.4806	0.91	0.4762	64192	572	349	113	29.95
34 ¹	Ilex Dahoon, var. myrtifolia	0.5873	0.90	0.5820	36.60

Catalogue Number.	Species.	Specific Gravity.	Percentage of Ash.	Relative Approximate Fuel Value.	Coefficient of Elasticity.	Modulus of Rupture.	Resistance to Longitudinal Pressure.	Resistance to Indentation.	Weight of a Cubic Foot in Pounds.
35	Ilex Cassine	0.7270	0.87	0.7207	45.31
36	Ilex decidua	0.7420	0.70	0.7368	46.24
37	Cyrilla racemiflora	0.6784	0.42	0.6756	48828	314	43.28
38	Cliftonia ligustrina	0.6249	0.42	0.6223	78250	626	371	147	38.96
39	Euonymus atropurpureus	0.6592	0.58	0.6554	41.08
40	Myginda pallens	0.9048	3.42	0.8739	56.39
41	Schefferia frutescens	0.7745	2.54	0.7548	48.27
42	Reynosa latifolia	1.0715	3.20	1.0372	105005	820	839	639	66.78
43	Condalia ferrea	1.3020	8.81	1.1938	114316	904	803	649	81.14
44	Condalia obovata	1.1999	7.03	1.1155	74.78
45	Rhamnus Californiana	0.5402	0.64	0.5427	74084	607	444	136	34.04
46	Rhamnus Californica	0.6000	0.58	0.5965	37.39
47	Rhamnus Purshiana	0.5672	0.67	0.5634	91268	750	621	192	35.85
48	Ceanothus thyrsiflorus	0.5750	0.69	0.5710	35.88
49	Colubrina reclinata	0.8208	1.75	0.8064	97656	1216	51.15
50	Æsculus glabra	0.4542	0.86	0.4503	64438	494	313	71	28.31
51	Æsculus flava	0.4274	1.00	0.4231	26.64
52	Æsculus Californica	0.4980	0.70	0.4945	68216	635	355	108	31.04
53	Ungnadia speciosa	0.6332	1.17	0.6258	394	149	39.46
54	Sapindus marginatus	0.8125	1.50	0.8004	83681	843	470	272	50.64
55	Sapindus Saponaria	0.8367	4.34	0.8004	52.14
56	Hypelate paniculata	0.9533	1.25	0.9414	111144	1190	666	...	59.41
57	Hypelate trifoliata	0.9102	1.38	0.8976	439	384	56.72
58	Acer Pennsylvanicum	0.5299	0.36	0.5280	33.02
59	Acer spicatum	0.5330	0.43	0.5307	33.22
60	Acer macrophyllum	0.4909	0.54	0.4882	78032	684	381	162	30.59
61	Acer circinatum	0.6000	0.39	0.6034	71810	766	450	200	41.51
62	Acer glabrum	0.6028	0.30	0.6010	37.57
63	Acer grandidentatum	0.6902	0.64	0.6858	43.01
64	Acer saccharinum	0.6912	0.54	0.6875	146108	1149	619	257	43.08
64 ¹	Acer saccharinum, var. nigrum	0.6915	0.71	0.6806	102726	962	550	252	43.09
65	Acer dasycarpum	0.5209	0.33	0.5252	110973	1019	482	181	32.84
66	Acer rubrum	0.6178	0.37	0.6155	94284	811	463	176	38.50
66 ¹	Acer rubrum, var. Drummondii	0.5459	0.34	0.5440	34.02
67	Negundo aceroides	0.4328	1.07	0.4282	58166	529	322	111	26.97
68	Negundo Californicum	0.4821	0.54	0.4795	94532	796	442	107	30.04
69	Rhus cotinoides	0.6425	0.50	0.6393	40.04
70	Rhus typhina	0.4357	0.50	0.4235	27.15
71	Rhus copallina	0.5273	0.60	0.5241	73647	663	377	109	32.86
71 ¹	Rhus copallina, var. lanceolata	0.5184	0.85	0.5140	479	126	32.31
72	Rhus venenata	0.4382	0.64	0.4354	27.31
73	Rhus Metopium	0.7917	2.39	0.7728	105007	656	523	200	49.34
74	Pistacia Mexicana
75	Eysenhardtia orthocarpa	0.8740	1.28	0.8628	54.47
76	Dalea spincsa	0.5536	4.04	0.5312	34.60
77	Robinia Pseudacacia	0.7333	0.51	0.7296	129238	1273	694	258	45.70
78	Robinia viscosa	0.8094	0.20	0.8078	50.44
79	Robinia Neo-Mexicana	0.8034	0.60	0.7986	114880	909	683	271	50.07
80	Olneya Tesota	1.0602	2.29	1.0359	80822	750	366	655	66.07
81	Piscidia Erythrina	0.8734	3.38	0.8439	85079	752	597	337	54.43
82	Cladrastis tinctoria	0.6278	0.28	0.6200	100226	902	534	183	39.12
83	Sophora secundiflora	0.9842	1.59	0.9686	61.34
84	Sophora affinis	0.8509	0.78	0.8443	97694	811	570	334	53.08
85	Gymnocladus Canadensis	0.6934	0.67	0.6888	104822	771	400	160	43.21
86	Gleditsia triacanthos	0.6740	0.80	0.6686	108579	923	500	168	42.00

Catalogue Number.	Species.	Specific Gravity.	Percentage of Ash.	Relative Approximate Fuel Value.	Coefficient of Elasticity.	Modulus of Rupture.	Resistance to Longitudinal Pressure.	Resistance to Indentation.	Weight of a Cubic Foot in Pounds.
87	Gleditsia monosperma	0.7342	0.73	0.7288	116991	1027	584	276	45.76
88	Parkinsonia Torreyana	0.6531	1.12	0.6458	56839	646	417	226	40.70
89	Parkinsonia microphylla	0.7449	3.64	0.7178	46.42
90	Parkinsonia aculeata	0.6116	2.32	0.5974	38.11
91	Cercis Canadensis	0.6363	0.72	0.6317	68798	720	469	182	39.65
92	Cercis reniformis	0.7513	0.77	0.7455	46.82
93	Prosopis juliflora	0.7652	2.18	0.7485	58297	485	588	343	47.69
94	Prosopis pubescens	0.7609	0.95	0.7537	82424	894	671	329	47.42
95	Leucaena glauca	0.6235	3.29	0.8981	57.55
96	Leucaena pulverulenta	0.6732	1.01	0.6664	41.95
97	Acacia Wrightii	0.9392	0.63	0.9333	58.58
98	Acacia Greggii	0.8560	0.91	0.8472	108607	792	743	...	53.28
99	Acacia Berlandieri
100	Lysiloma latissilqua	0.6418	2.12	0.6282	46064	553	481	171	40.00
101	Pithecolobium Unguis-cati	0.6049	2.46	0.8826	56.39
102	Chrysobalanus Icaco	0.7709	0.87	0.7642	110973	961	...	221	48.04
103	Prunus Americana	0.7215	0.18	0.7202	82659	864	588	213	44.96
104	Prunus angustifolia	0.6884	0.28	0.6865	60281	408	402	133	42.00
105	Prunus Pennsylvanica	0.5023	0.40	0.5003	407	103	31.30
106	Prunus umbellata	0.8202	0.12	0.8192	498	342	51.11
107	Prunus emarginata, var. mollis	0.4502	0.21	0.4493	86055	679	460	80	28.06
108	Prunus serotina	0.5822	0.15	0.5818	86583	829	547	204	36.28
109	Prunus Capuli	0.7879	0.20	0.7863	538	272	49.10
110	Prunus demissa	0.6951	0.50	0.6916	76895	691	510	246	43.32
111	Prunus Caroliniana	0.8688	0.41	0.8652	93727	928	562	318	54.14
112	Prunus sphaerocarpa	0.8998	0.87	0.8920	56.08
113	Prunus ilicifolia	0.9803	0.78	0.9727	73201	782	544	305	61.09
114	Vanuelinia Torreyi	1.1374	1.45	1.1209	70.88
115	Cercocarpus liliifolius	1.0731	1.04	1.0619	655	480	66.88
116	Cercocarpus parvifolius	0.9365	0.46	0.9323	58.36
117	Pyrus coronaria	0.7048	0.52	0.7011	64241	485	419	250	42.92
118	Pyrus angustifolia	0.6895	0.33	0.6872	42.97
119	Pyrus rivularis	0.8316	0.41	0.8282	51.83
120	Pyrus Americana	0.5451	0.83	0.5406	380	117	33.97
121	Pyrus sambucifolia	0.5928	0.35	0.5908	62600	445	383	107	36.94
122	Crataegus rivularis	0.7708	0.35	0.7676	48.00
123	Crataegus Douglasii	0.6950	0.33	0.6927	43.31
124	Crataegus brachyacantha	0.6793	0.42	0.6764	42.33
125	Crataegus arboreascens	0.6491	0.56	0.6454	78837	621	498	184	40.45
126	Crataegus Crus-galli	0.7194	0.56	0.7154	66436	653	430	210	44.83
127	Crataegus coccinea	0.8618	0.38	0.8585	53.71
128	Crataegus subvillosa	0.7953	0.60	0.7898	90023	738	538	263	49.56
129	Crataegus tomentosa	0.7585	0.52	0.7546	73160	709	445	240	47.57
129 ¹	Crataegus tomentosa, var. punctata	0.7681	0.47	0.7645	47.87
130	Crataegus cordata	0.7293	0.46	0.7259	45.45
131	Crataegus apiifolia	0.7453	0.97	0.7381	46.45
132	Crataegus spathulata	0.7159	0.66	0.7112	67349	506	455	218	44.61
133	Crataegus berberifolia
134	Crataegus aestivalis	0.6564	0.57	0.6527	59185	712	445	224	40.91
135	Crataegus flava	0.7809	0.79	0.7747	48.67
135 ¹	Crataegus flava, var. pubescens	0.7083	0.91	0.7613	70765	724	627	319	47.88
136	Heteromeles arbutifolia	0.9326	0.54	0.9276	58.12
137	Amelanchier Canadensis	0.7838	0.55	0.7795	119677	1132	670	280	48.85
138	Hamamelis Virginica	0.6350	0.37	0.6331	42.73
139	Liquidambar Styraciflua	0.5903	0.61	0.5873	86388	651	466	132	36.82

Catalogue Number.	Species.	Specific Gravity.	Percentage of Ash.	Relative Approximate Fuel Value.	Coefficient of Elasticity.	Modulus of Rupture.	Resistance to Longitudinal Pressure.	Resistance to Indentation.	Weight of a Cubic Foot in Pounds.
140	Rhizophora Mangle	1.1617	1.82	1.1406	165507	1207	800	462	72.40
141	Conocarpus erecta	0.9900	0.32	0.9863	102411	942	599	370	61.70
142	Laguncularia racemosa	0.7187	1.62	0.7021	72396	518	449	149	44.48
143	Calyptanthus Chytraculia	0.8902	3.32	0.8693	60.04
144	Eugenia buxifolia	0.9369	1.50	0.9220	157510	1055	887	396	68.28
145	Eugenia dichotoma	0.8983	0.74	0.8917	65.97
146	Eugenia monticola	0.9156	1.89	0.8983	108507	1172	563	408	67.06
147	Eugenia longipes	1.1235	3.48	1.0844	70.02
148	Eugenia procera	0.9453	2.62	0.9205	119111	1176	672	444	68.91
149	Cereus giganteus	0.3188	3.45	0.3078	19.87
150	Cornus alternifolia	0.6606	0.41	0.6669	41.73
151	Cornus florida	0.8153	0.67	0.8098	92112	904	524	305	50.81
152	Cornus Nuttallii	0.7481	0.50	0.7444	108081	991	673	242	46.62
153	Nyssa capitata	0.4613	0.34	0.4597	68083	682	431	155	28.75
154	Nyssa sylvatica	0.6356	0.62	0.6323	81832	880	468	196	39.61
155	Nyssa uniflora	0.5194	0.70	0.5158	51678	655	365	161	32.37
156	Sambucus glauca	0.5087	1.57	0.5007	30617	370	275	138	31.70
157	Sambucus Mexicana	0.4614	2.00	0.4522	28.75
158	Viburnum Lentago	0.7303	0.29	0.7282	555	..	45.61
159	Viburnum prunifolium	0.8332	0.52	0.8289	90654	951	592	318	51.93
160	Exostema Caribæum	0.9310	0.23	0.9289	119357	1065	751	481	68.02
161	Pinckneya pubes	0.5359	0.41	0.5328	68291	405	272	105	33.34
162	Genipa clusifolia	1.0316	1.06	1.0207	64.29
163	Guettarda elliptica	0.8237	1.05	0.8250	51.96
164	Vaccinium arboreum	0.7610	0.39	0.7580	399	279	47.43
165	Andromeda ferruginea	0.7599	0.46	0.7465	81880	679	487	225	46.74
166	Arbutus Menziesii	0.7052	0.40	0.7024	82834	907	502	207	43.95
167	Arbutus Xalapensis	0.7099	0.26	0.7081	61577	618	401	247	44.24
168	Arbutus Texana	0.7500	0.51	0.7462	46.74
169	Oxydendrum arboreum	0.7468	0.37	0.7430	88851	728	501	201	46.48
170	Kalmia latifolia	0.7169	0.41	0.7131	68484	639	430	202	44.62
171	Rhododendron maximum	0.6303	0.26	0.6280	64578	603	439	191	39.28
172	Myrsine Rapauea	0.8241	0.81	0.8271	51.98
173	Ardisia Pickeringia	0.8002	1.84	0.8444	58.61
174	Jacquinia armillaris	0.6948	2.45	0.6708	43.30
175	Chrysophyllum oliviforme	0.9360	1.24	0.9244	112424	857	598	382	68.33
176	Sideroxylon Mastichodendron	1.0109	5.14	0.9589	109948	970	650	355	63.00
177	Diphollis salicifolia	0.9316	0.32	0.9286	133503	1148	730	274	58.06
178	Bumelia tenax	0.7298	0.78	0.7226	75120	673	452	181	45.45
179	Bumelia lanuginosa	0.6544	1.23	0.6464	48394	387	362	160	40.78
180	Bumelia spinosa	0.6603	1.24	0.6521	41.15
181	Bumelia lycioides	0.7407	0.81	0.7407	78125	562	489	220	46.63
182	Bumelia cuneata	0.7959	1.90	0.7808	60281	515	478	286	49.60
183	Mimusops Sieberi	1.0838	2.61	1.0555	100226	914	460	375	67.64
184	Diospyros Virginiana	0.7908	0.96	0.7832	78234	879	503	324	49.28
185	Diospyros Texana	0.8460	3.33	0.8178	52.72
186	Symplocos tinctoria	0.5325	0.68	0.5289	62202	619	384	159	33.19
187	Halesia diptera	0.5705	0.42	0.5681	68321	857	434	197	35.55
188	Halesia tetraptera	0.5628	0.40	0.5605	35.07
189	Fraxinus Greggii	0.7904	0.93	0.7830	49.26
190	Fraxinus anomala	0.6597	0.85	0.6541	41.11
191	Fraxinus pistaciæfolia	0.6810	0.62	0.6768	60119	622	385	210	42.44
192	Fraxinus Americana	0.6543	0.42	0.6516	101068	861	463	171	40.78
193	Fraxinus Americana, var. Texensis	0.7636	0.70	0.7583	108174	1125	541	198	47.59
193	Fraxinus pubescens	0.6251	0.26	0.6235	81222	869	435	204	38.96

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194	<i>Fraxinus viridis</i>	0.7117	0.65	0.7071	90313	895	482	220	44.35
194 ¹	<i>Fraxinus viridis</i> , var. <i>Berlandieriana</i>	0.5780	0.54	0.5749	36.02
195	<i>Fraxinus platycarpa</i>	0.3541	0.73	0.3515	47637	536	251	138	22.07
196	<i>Fraxinus quadrangulata</i>	0.7184	0.78	0.7128	77439	811	499	222	44.77
197	<i>Fraxinus Oregana</i>	0.5731	0.34	0.5712	84818	665	520	166	35.72
198	<i>Fraxinus sambucifolia</i>	0.6318	0.72	0.6273	87185	806	423	194	39.87
199	<i>Forestiera acuminata</i>	0.6345	0.72	0.6299	70282	717	401	170	39.54
200	<i>Chionanthus Virginica</i>	0.6372	0.51	0.6340	39.71
201	<i>Osmanthus Americanus</i>	0.8111	0.46	0.8074	123133	1051	547	247	50.55
202	<i>Cordia Sebestena</i>	0.7108	4.22	0.6808	44.30
203	<i>Cordia Boissieri</i>	0.6790	3.53	0.6550	42.32
204	<i>Bourreria Havanensis</i>	0.8073	2.79	0.7848	99649	944	575	294	50.31
205	<i>Ehretia elliptica</i>	0.6440	1.32	0.6355	39697	721	387	229	40.13
206	<i>Catalpa bignonioides</i>	0.4474	0.38	0.4457	68161	590	364	77	27.88
207	<i>Catalpa speciosa</i>	0.4165	0.89	0.4149	82156	635	407	86	25.96
208	<i>Chilopsis saligna</i>	0.5902	0.87	0.5880	54421	578	297	144	36.78
209	<i>Crescentia cucurbitina</i>	0.6319	1.35	0.6234	39.58
210	<i>Citharexylum villosum</i>	0.8710	0.52	0.8665	125717	937	689	308	54.28
211	<i>Avicennia nitida</i>	0.9138	2.51	0.8909	56.95
212	<i>Pisonia obtusata</i>	0.6529	7.62	0.6031	46503	297	310	108	40.69
213	<i>Coccoloba Floridana</i>	0.9835	5.03	0.9340	115538	918	771	394	61.29
214	<i>Coccoloba uvifera</i>	0.9635	1.37	0.9503	258	...	60.05
215	<i>Persea Carolinensis</i>	0.6429	0.76	0.6380	83900	902	573	199	40.07
215 ¹	<i>Persea Carolinensis</i> , var. <i>palustris</i>	0.6396	0.37	0.6372	84018	820	367	192	39.86
216	<i>Nectandra Willdenoviana</i>	0.7093	0.60	0.7647	47.94
217	<i>Sassafras officinale</i>	0.5042	0.10	0.5037	51910	602	382	134	31.42
218	<i>Umbellularia Californica</i>	0.6517	0.39	0.6492	106766	803	568	199	40.61
219	<i>Drypetes crocea</i>	0.9209	6.14	0.8644	103890	796	650	362	57.39
219 ¹	<i>Drypetes crocea</i> , var. <i>latifolia</i>	0.9346	8.29	0.8571	83619	707	520	407	58.24
220	<i>Sebastiania lucida</i>	1.0905	2.78	1.0902	67.96
221	<i>Hippomane Mancinella</i>	0.5772	5.16	0.5474	35.97
222	<i>Ulmus crassifolia</i>	0.7245	1.20	0.7158	70399	773	463	255	45.15
223	<i>Ulmus fulva</i>	0.6956	0.83	0.6898	95274	869	539	150	43.35
224	<i>Ulmus Americana</i>	0.6500	0.80	0.6454	74742	852	446	170	40.55
225	<i>Ulmus racemosa</i>	0.7263	0.60	0.7219	109628	1066	592	205	45.26
226	<i>Ulmus alata</i>	0.7491	0.99	0.7417	52323	724	449	255	46.68
227	<i>Planera aquatica</i>	0.5294	0.45	0.5270	55167	621	394	146	32.99
228	<i>Celtis occidentalis</i>	0.7287	1.09	0.7208	68527	789	421	217	45.41
228 ¹	<i>Celtis occidentalis</i> , var. <i>reticulata</i>	0.7275	1.22	0.7186	86805	805	437	273	45.34
229	<i>Ficus aurea</i>	0.2616	5.03	0.2484	25699	239	102	61	16.30
230	<i>Ficus brevifolia</i>	0.6398	4.36	0.6119	30.87
231	<i>Ficus pedunculata</i>	0.4739	4.02	0.4506	40690	220	281	119	29.53
232	<i>Morus rubra</i>	0.5898	0.71	0.5856	82377	775	420	178	36.76
233	<i>Morus microphylla</i>	0.7715	0.63	0.7663	48.08
234	<i>Maclura aurantiaca</i>	0.7736	0.68	0.7683	94373	1131	890	363	48.21
235	<i>Platanus occidentalis</i>	0.5678	0.46	0.5652	86402	635	460	165	35.39
236	<i>Platanus racemosa</i>	0.4880	1.11	0.4826	62401	562	324	93	30.41
237	<i>Platanus Wrightii</i>	0.4736	1.35	0.4672	45644	428	327	117	29.51
238	<i>Juglans cinerea</i>	0.4086	0.51	0.4065	81253	597	392	90	25.46
239	<i>Juglans nigra</i>	0.6115	0.79	0.6067	109200	856	583	196	38.11
240	<i>Juglans rupestris</i>	0.6554	1.01	0.6488	72032	900	437	182	40.84
241	<i>Carya olivæformis</i>	0.7180	1.13	0.7099	66646	578	434	232	44.75
242	<i>Carya alba</i>	0.8372	0.73	0.8311	138339	1200	625	271	52.17
243	<i>Carya sulcata</i>	0.8108	0.90	0.8035	103284	1083	559	288	50.53
244	<i>Carya tomentosa</i>	0.8218	1.06	0.8131	114995	1129	593	277	51.21

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245	<i>Carya porcina</i>	0.8217	0.99	0.8136	103300	1046	577	301	51.21
246	<i>Carya amara</i>	0.7552	1.03	0.7474	102986	1101	522	242	47.06
247	<i>Carya myristiciformis</i>	0.8016	1.06	0.7931	146484	1394	638	315	49.96
248	<i>Carya aquatica</i>	0.7407	1.27	0.7313	101261	884	486	274	46.16
249	<i>Myrica cerifera</i>	0.5637	0.61	0.5608	88778	815	445	144	35.18
250	<i>Myrica Californica</i>	0.6703	0.33	0.6681	99161	1036	532	188	41.77
251	<i>Quercus alba</i>	0.7470	0.41	0.7439	97089	905	511	213	46.35
252	<i>Quercus lobata</i>	0.7409	0.30	0.7387	71604	864	424	188	46.17
253	<i>Quercus Garryana</i>	0.7453	0.39	0.7424	81109	879	505	240	46.45
254	<i>Quercus obtusiloba</i>	0.8367	0.79	0.8301	83257	872	487	276	52.14
255	<i>Quercus undulata</i> , var. <i>Gambellii</i>	0.8407	0.99	0.8324	57162	680	417	255	52.39
256	<i>Quercus macrocarpa</i>	0.7453	0.71	0.7400	92929	982	401	233	46.45
257	<i>Quercus lyrata</i>	0.8313	0.65	0.8259	133438	1025	492	252	51.81
258	<i>Quercus bicolor</i>	0.7662	0.58	0.7618	90635	909	490	221	47.75
259	<i>Quercus Michauxii</i>	0.8039	0.45	0.8003	96373	1118	482	233	50.10
260	<i>Quercus Prinus</i>	0.7499	0.77	0.7441	125473	1031	538	230	46.78
261	<i>Quercus prinoides</i>	0.8005	1.14	0.8607	112461	1238	575	264	53.63
262	<i>Quercus Douglasii</i>	0.8028	0.84	0.8853	77106	993	557	374	55.64
263	<i>Quercus oblongifolia</i>	0.9441	2.61	0.9195	85739	719	434	439	58.84
264	<i>Quercus grisea</i>	1.0092	1.82	0.9908	73982	937	479	364	62.89
265	<i>Quercus reticulata</i>	0.9479	0.52	0.9430	59.07
266	<i>Quercus Durandii</i>	0.9507	1.78	0.9338	83766	993	534	308	59.25
267	<i>Quercus virens</i>	0.9501	1.14	0.9393	113627	1017	547	324	59.21
268	<i>Quercus chrysolepis</i>	0.8493	0.60	0.8442	119810	1268	645	317	52.93
269	<i>Quercus Emoryi</i>	0.9263	2.36	0.9044	63828	703	422	415	57.78
270	<i>Quercus agrifolia</i>	0.8253	1.28	0.8147	95278	985	463	235	51.43
271	<i>Quercus Weslizeni</i>	0.7855	1.02	0.7775	86055	818	533	272	48.95
272	<i>Quercus rubra</i>	0.6540	0.26	0.6523	112798	990	511	177	40.76
272 ¹	<i>Quercus rubra</i> , var. <i>Texana</i>	0.9080	0.85	0.9003	103343	1024	582	291	56.50
273	<i>Quercus coccinea</i>	0.7405	0.19	0.7391	108507	1054	504	202	46.15
274	<i>Quercus tinctoria</i>	0.7045	0.28	0.7025	108427	1041	501	202	43.00
275	<i>Quercus Kelloggii</i>	0.6435	0.26	0.6418	74488	768	449	174	40.10
276	<i>Quercus nigra</i>	0.7324	1.16	0.7239	97656	1043	497	280	45.64
277	<i>Quercus falcata</i>	0.6928	0.25	0.6911	140151	1193	596	201	43.18
278	<i>Quercus Catesbaei</i>	0.7294	0.87	0.7231	103408	1046	457	228	45.46
279	<i>Quercus palustris</i>	0.6938	0.81	0.6882	112206	1090	491	190	43.24
280	<i>Quercus aquatica</i>	0.7244	0.51	0.7207	122657	1052	501	198	45.14
281	<i>Quercus laurifolia</i>	0.7673	0.82	0.7610	125016	1181	526	253	47.82
282	<i>Quercus heterophylla</i>	0.6834	0.17	0.6822	122404	1073	412	182	42.59
283	<i>Quercus cinerea</i>	0.6420	1.21	0.6342	75120	993	448	201	40.01
284	<i>Quercus hypoleuca</i>	0.8009	1.34	0.7902	94409	1113	293	272	49.91
285	<i>Quercus imbricaria</i>	0.7529	0.43	0.7497	119357	1218	552	226	46.92
286	<i>Quercus Phellos</i>	0.7472	0.50	0.7435	78440	989	390	216	46.57
287	<i>Quercus densiflora</i>	0.6827	1.49	0.6725	96347	946	475	224	42.55
288	<i>Castanopsis chrysophylla</i>	0.5574	0.35	0.5554	101195	741	435	119	34.74
289	<i>Castanea pumila</i>	0.5887	0.12	0.5880	114108	991	495	118	36.69
290	<i>Castanea vulgaris</i> , var. <i>Americana</i>	0.4504	0.18	0.4496	85621	696	381	106	28.07
291	<i>Fagus ferruginea</i>	0.6883	0.51	0.6848	120906	1148	478	196	42.89
292	<i>Ostrya Virginica</i>	0.8284	0.50	0.8243	137276	1134	542	231	51.63
293	<i>Carpinus Caroliniana</i>	0.7286	0.83	0.7226	114881	1149	498	213	45.41
294	<i>Betula alba</i> , var. <i>populifolia</i>	0.5760	0.29	0.5743	72970	778	348	129	35.90
295	<i>Betula papyrifera</i>	0.5955	0.25	0.5940	130557	1065	487	126	37.11
296	<i>Betula occidentalis</i>	0.6030	0.30	0.6012	92424	806	391	127	37.58
297	<i>Betula lutea</i>	0.6553	0.31	0.6533	161723	1248	619	161	40.84
298	<i>Betula nigra</i>	0.5762	0.35	0.5742	111322	972	438	132	35.91

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299	<i>Betula lenta</i>	0.7617	0.26	0.7597	141898	1216	619	226	47.47
300	<i>Alnus maritima</i>	0.4996	0.39	0.4977	129	31.14
301	<i>Alnus rubra</i>	0.4813	0.42	0.4793	106046	811	415	117	29.99
302	<i>Alnus rhombifolia</i>	0.4127	0.31	0.4104	84680	682	356	78	25.72
303	<i>Alnus oblongifolia</i>	0.3981	0.42	0.3964	76937	686	278	74	24.81
304	<i>Alnus serrulata</i>	0.4666	0.38	0.4648	20.08
305	<i>Alnus incana</i>	0.4607	0.42	0.4588	108507	820	289	..	28.71
305 ¹	<i>Alnus incana</i> , var. <i>virescens</i>
306	<i>Salix nigra</i>	0.4456	0.70	0.4425	39062	424	213	93	27.77
307	<i>Salix amygdaloides</i>	0.4500	0.92	0.4408	50144	550	204	81	28.10
308	<i>Salix laevigata</i>	0.4872	0.58	0.4844	48828	644	319	118	30.36
309	<i>Salix lasiandra</i>	0.4756	0.60	0.4727	29.64
309 ¹	<i>Salix lasiandra</i> , var. <i>lanceifolia</i>	0.4547	0.79	0.4411	87935	675	341	87	28.34
309 ²	<i>Salix lasiandra</i> , var. <i>Fendleriana</i>	0.4598	0.56	0.4572	30517	469	286	82	28.65
310	<i>Salix longifolia</i>	0.4930	0.48	0.4900	30.72
310 ¹	<i>Salix longifolia</i> , var. <i>exigua</i>	0.5342	1.06	0.5285	33.29
310 ²	<i>Salix longifolia</i> , var. <i>argyrophylla</i>
311	<i>Salix sessilifolia</i>	0.4307	0.50	0.4375	27.40
311 ¹	<i>Salix sessilifolia</i> , var. <i>Hindsiana</i>
312	<i>Salix discolor</i>	0.4261	0.43	0.4243	26.55
313	<i>Salix flavescens</i>	0.4969	0.61	0.4939	108507	808	408	98	30.97
313 ¹	<i>Salix flavescens</i> , var. <i>Scouleriana</i>	0.5412	0.39	0.5391	126216	909	468	126	33.73
314	<i>Salix Hookeriana</i>	0.5350	0.32	0.5333	427	111	33.34
315	<i>Salix cordata</i> , var. <i>vestita</i>	0.6009	0.59	0.6033	37.82
316	<i>Salix lasiolepis</i>	0.5587	0.98	0.5532	88778	813	385	140	34.82
317	<i>Salix Sitcheensis</i>	0.5072	0.50	0.5042	31.61
318	<i>Populus tremuloides</i>	0.4032	0.55	0.4010	81441	677	330	80	25.13
319	<i>Populus grandidentata</i>	0.4632	0.45	0.4611	96327	721	358	62	28.87
320	<i>Populus heterophylla</i>	0.4089	0.81	0.4056	72338	642	283	86	25.48
321	<i>Populus balsamifera</i>	0.3635	0.66	0.3611	85690	550	320	75	22.65
321 ¹	<i>Populus balsamifera</i> , var. <i>candicans</i>	0.4161	0.46	0.4142	73024	609	276	64	25.93
322	<i>Populus angustifolia</i>	0.3912	0.79	0.3881	45847	400	271	76	24.38
323	<i>Populus trichocarpa</i>	0.3814	1.27	0.3766	111604	665	390	63	23.77
324	<i>Populus monilifera</i>	0.3889	0.96	0.3862	99417	770	353	83	24.24
325	<i>Populus Fremontii</i>	0.4914	0.77	0.4876	105116	698	378	86	30.62
325 ¹	<i>Populus Fremontii</i> , var. <i>Wislizeni</i>	0.4621	1.13	0.4569	84317	691	372	100	28.80
326	<i>Libocedrus decurrens</i>	0.4017	0.08	0.4014	84729	682	403	98	25.03
327	<i>Thuja occidentalis</i>	0.3164	0.37	0.3152	53311	512	306	60	19.72
328	<i>Thuja gigantea</i>	0.3796	0.17	0.3790	103372	749	450	70	23.66
329	<i>Chamaecyparis sphaeroidea</i>	0.3322	0.33	0.3311	40410	456	259	67	20.70
330	<i>Chamaecyparis Nutkaensis</i>	0.4782	0.34	0.4766	102881	801	455	101	29.80
331	<i>Chamaecyparis Lawsoniana</i>	0.4621	0.10	0.4616	121772	888	466	82	28.80
332	<i>Cupressus macrocarpa</i>	0.6261	0.57	0.6225	107327	1045	..	237	39.02
333	<i>Cupressus Goveniana</i>	0.4689	0.45	0.4668	49941	539	359	178	29.22
334	<i>Cupressus Macnabiana</i>
335	<i>Cupressus Guadalupeensis</i>	0.4843	0.44	0.4822	30.18
336	<i>Juniperus Californica</i>	0.6282	0.75	0.6235	39.15
336 ¹	<i>Juniperus Californica</i> , var. <i>Utahensis</i>	0.5522	0.49	0.5495	34.41
337	<i>Juniperus pachyphloea</i>	0.5829	0.11	0.5823	61275	761	36.32
338	<i>Juniperus occidentalis</i>	0.5765	0.12	0.5758	186	35.93
338 ¹	<i>Juniperus occidentalis</i> , var. <i>monosperma</i>	0.7118	0.78	0.7062	44.26
338 ²	<i>Juniperus occidentalis</i> , var. <i>conjugens</i>	0.6907	0.46	0.6875	73426	468	532	286	43.04
339	<i>Juniperus Virginiana</i>	0.4926	0.13	0.4920	60992	740	416	148	30.70
340	<i>Taxodium distichum</i>	0.4543	0.42	0.4524	103206	682	423	81	28.31

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341	<i>Sequoia gigantea</i>	0.2882	0.50	0.2868	45146	459	388	68	17.96
342	<i>Sequoia sempervirens</i>	0.4208	0.14	0.4202	67646	597	416	77	20.22
343	<i>Taxus brevifolia</i>	0.6301	0.22	0.6377	76133	1078	483	264	39.83
344	<i>Taxus Florida</i>	0.6340	0.21	0.6327	39.51
345	<i>Torreya taxifolia</i>	0.5145	0.73	0.5107	82883	587	460	158	32.06
346	<i>Torreya Californica</i>	0.4760	1.84	0.4696	40146	583	351	122	29.66
347	<i>Pinus Strobus</i>	0.3854	0.19	0.3847	85093	626	339	74	24.02
348	<i>Pinus monticola</i>	0.3908	0.23	0.3899	95068	600	334	67	24.35
349	<i>Pinus Lambertiana</i>	0.3084	0.22	0.3676	79375	597	336	78	22.96
350	<i>Pinus flexilis</i>	0.4358	0.28	0.4346	67531	624	349	108	27.16
351	<i>Pinus albicaulis</i>	0.4105	0.27	0.4164	38147	581	831	107	25.96
352	<i>Pinus reflexa</i>	0.4877	0.26	0.4804	91287	770	489	128	30.39
353	<i>Pinus Parryana</i>	0.5675	0.54	0.5644	37783	426	339	195	35.37
354	<i>Pinus cembroides</i>	0.6512	0.90	0.6453	40.58
355	<i>Pinus edulis</i>	0.6388	0.62	0.6348	42094	447	349	212	39.81
356	<i>Pinus monophylla</i>	0.5658	0.68	0.5620	43488	288	274	169	35.26
357	<i>Pinus Balfouriana</i>	0.5434	0.40	0.5412	59386	424	337	147	33.86
357 ¹	<i>Pinus Balfouriana, var. aristata</i>	0.5572	0.30	0.5555	71482	653	325	134	34.72
358	<i>Pinus resinosa</i>	0.4854	0.27	0.4841	113216	800	455	85	30.25
359	<i>Pinus Torreyana</i>	0.4879	0.35	0.4802	54213	756	290	147	30.41
360	<i>Pinus Arizona</i>	0.5038	0.20	0.5028	82370	653	381	105	31.40
361	<i>Pinus ponderosa</i>	0.4715	0.35	0.4698	88731	720	381	107	29.88
362	<i>Pinus Jeffreyi</i>	0.5206	0.26	0.5192	92777	744	417	116	32.44
363	<i>Pinus Chihuahuana</i>	0.5457	0.39	0.5436	72575	832	337	154	34.01
364	<i>Pinus contorta</i>	0.5815	0.19	0.5804	158533	903	554	149	36.24
365	<i>Pinus Murrayana</i>	0.4096	0.32	0.4083	77113	564	333	86	25.58
366	<i>Pinus Sabiniana</i>	0.4840	0.40	0.4821	58517	779	337	138	30.16
367	<i>Pinus Coulteri</i>	0.4133	0.37	0.4118	114108	761	367	92	25.76
368	<i>Pinus insignis</i>	0.4574	0.30	0.4560	97850	740	417	105	28.51
369	<i>Pinus tuberculata</i>	0.3499	0.33	0.3487	42870	409	263	86	21.81
370	<i>Pinus Taeda</i>	0.5441	0.26	0.5427	112847	883	427	107	33.91
371	<i>Pinus rigida</i>	0.5151	0.23	0.5139	58127	739	355	133	32.10
372	<i>Pinus serotina</i>	0.7942	0.17	0.7928	116957	1164	505	296	49.49
373	<i>Pinus inops</i>	0.5309	0.30	0.5293	54295	658	360	156	33.09
374	<i>Pinus clausa</i>	0.5576	0.31	0.5559	54295	502	377	131	34.75
375	<i>Pinus pungens</i>	0.4935	0.27	0.4922	80330	726	354	115	30.75
376	<i>Pinus muricata</i>	0.4942	0.26	0.4929	119357	1031	509	122	30.80
377	<i>Pinus mitis</i>	0.6104	0.29	0.6086	137495	1038	477	129	38.04
378	<i>Pinus glabra</i>	0.3931	0.45	0.3913	44750	496	288	106	24.50
379	<i>Pinus Banksiana</i>	0.4761	0.23	0.4750	94231	652	396	101	29.67
380	<i>Pinus palustris</i>	0.6999	0.25	0.6982	148733	1162	629	153	43.62
381	<i>Pinus Cubensis</i>	0.7504	0.26	0.7484	157747	1172	664	186	46.76
382	<i>Picea nigra</i>	0.4584	0.27	0.4572	109987	747	407	77	28.57
383	<i>Picea alba</i>	0.4051	0.32	0.4038	102280	747	342	74	25.25
384	<i>Picea Engelmanni</i>	0.3449	0.32	0.3438	80791	574	207	76	21.49
385	<i>Picea pungens</i>	0.3740	0.38	0.3726	55360	454	258	79	23.31
386	<i>Picea Sitchensis</i>	0.4287	0.17	0.4280	99001	649	353	73	26.72
387	<i>Tsuga Canadensis</i>	0.4239	0.46	0.4220	89970	736	384	82	26.42
388	<i>Tsuga Caroliniana</i>	0.4275	0.40	0.4258	71282	461	403	125	26.64
389	<i>Tsuga Mertensiana</i>	0.5182	0.42	0.5160	137483	909	547	101	32.29
390	<i>Tsuga Pattoniana</i>	0.4454	0.44	0.4434	77524	719	379	104	27.76
391	<i>Pseudotsuga Douglasii</i>	0.5157	0.08	0.5153	128297	881	519	100	32.14
391 ¹	<i>Pseudotsuga Douglasii, var. macrocarpa</i>	0.4563	0.08	0.4559	105007	846	463	102	28.44
392	<i>Abies Fraseri</i>	0.3565	0.54	0.3546	97170	639	347	65	22.22

Catalogue Number.	Species.	Specific Gravity.	Percentage of Ash.	Relative Approximate Fuel Value.	Coefficient of Elasticity.	Modulus of Rupture.	Resistance to Longitudinal Pressure.	Resistance to Indentation.	Weight of a Cubic Foot in Pounds.
393	<i>Abies balsamea</i>	0.3819	0.45	0.3802	81924	515	365	75	23.80
394	<i>Abies subalpina</i>	0.3476	0.44	0.3461	76199	473	302	64	21.66
395	<i>Abies grandis</i>	0.3545	0.49	0.3528	95838	494	391	51	22.09
396	<i>Abies concolor</i>	0.3638	0.85	0.3607	90889	703	390	78	22.67
397	<i>Abies bracteata</i>	0.6783	2.04	0.6645	42.27
398	<i>Abies amabilis</i>	0.4228	0.23	0.4218	126013	792	467	64	26.35
399	<i>Abies nobilis</i>	0.4561	0.34	0.4545	127660	862	453	120	28.42
400	<i>Abies magnifica</i>	0.4701	0.30	0.4687	66220	701	435	116	29.30
401	<i>Larix Americana</i>	0.6226	0.33	0.6215	126126	901	536	112	38.86
402	<i>Larix occidentalis</i>	0.7407	0.09	0.7400	165810	1227	689	189	46.16
403	<i>Larix Lyallii</i>
404	<i>Sabal Palmetto</i>	0.4404	7.66	0.4067	27.45
405	<i>Washingtonia filifera</i>	0.5173	1.89	0.5075	56346	429	227	66	32.24
406	<i>Thrinax parviflora</i>	0.5991	3.99	0.5752	37.34
407	<i>Thrinax argentea</i>	0.7172	3.01	0.6956	44.70
408	<i>Oreodoxa regia</i>	0.6034	2.21	0.5901	37.00
409	<i>Yucca canaliculata</i>	0.6677	6.27	0.6258	41.61
410	<i>Yucca brevifolia</i>	0.3737	4.00	0.3588	23.29
411	<i>Yucca elata</i>	0.4470	9.28	0.4055	27.66
412	<i>Yucca baccata</i>	0.2724	8.94	0.2480	16.98

TABLE II.

The Trees of the United States arranged in the Order of the Specific Gravity of their Dry Woods.

Relative Order.	Species.	Specific Gravity.	Relative Order.	Species.	Specific Gravity.
1	<i>Condalia ferrea</i>	1.3020	41	<i>Eugenia monticola</i>	0.9156
2	<i>Condalia obovata</i>	1.1999	42	<i>Avicennia nitida</i>	0.9138
3	<i>Rhizophora Mangle</i>	1.1617	43	<i>Hypelate trifoliata</i>	0.9102
4	<i>Guaiacum sanctum</i>	1.1432	44	<i>Quercus rubra</i> , var. <i>Texana</i>	0.9080
5	<i>Vauquelinia Torreyi</i>	1.1374	45	<i>Pithecolobium Unguis-cati</i>	0.9049
6	<i>Eugenia longipes</i>	1.1235	46	<i>Myginda pallens</i>	0.9048
7	<i>Portiera angustifolia</i>	1.1101	47	<i>Xanthoxylum Caribæum</i>	0.9002
8	<i>Sebastiania lucida</i>	1.0905	48	<i>Prunus sphaerocarpa</i>	0.8998
9	<i>Mimusops Sieberi</i>	1.0838	49	<i>Calyptranthes Chytraculia</i>	0.8992
10	<i>Cercocarpus ledifolius</i>	1.0731	50	<i>Eugenia dichotoma</i>	0.8983
11	<i>Reynosa latifolia</i>	1.0715	51	<i>Quercus Douglasii</i>	0.8928
12	<i>Olneya Tesota</i>	1.0602	52	<i>Eysenhardtia orthocarpa</i>	0.8740
13	<i>Amyris sylvatica</i>	1.0459	53	<i>Piscidia Erythrina</i>	0.8734
14	<i>Genipa clusæfolia</i>	1.0316	54	<i>Citharexylum villosum</i>	0.8710
15	<i>Sideroxylon Mastichodendron</i>	1.0109	55	<i>Prunus Caroliniana</i>	0.8688
16	<i>Quercus grisea</i>	1.0092	56	<i>Cratægus coccinea</i>	0.8618
17	<i>Conocarpus erecta</i>	0.9900	57	<i>Quercus prinoides</i>	0.8605
18	<i>Canella alba</i>	0.9893	58	<i>Ardisia Pickeringia</i>	0.8602
19	<i>Sophora secundiflora</i>	0.9842	59	<i>Acacia Greggii</i>	0.8550
20	<i>Coccoloba Floridana</i>	0.9835	60	<i>Sophora affinis</i>	0.8509
21	<i>Prunus ilicifolia</i>	0.9803	61	<i>Quercus chrysolepis</i>	0.8493
22	<i>Coccoloba uvifera</i>	0.9635	62	<i>Diospyros Texana</i>	0.8460
23	<i>Hypelate paniculata</i>	0.9533	63	<i>Quercus undulata</i> , var. <i>Gambelii</i>	0.8407
24	<i>Quercus Durandii</i>	0.9507	64	<i>Carya alba</i>	0.8372
25	<i>Quercus virens</i>	0.9501	65	<i>Sapindus Saponaria</i>	0.8367
26	<i>Quercus reticulata</i>	0.9479	66	<i>Quercus obtusiloba</i>	0.8367
27	<i>Eugenia procera</i>	0.9453	67	<i>Myrsine Rapanæ</i>	0.8341
28	<i>Quercus oblongifolia</i>	0.9441	68	<i>Guetarda elliptica</i>	0.8337
29	<i>Acacia Wrightii</i>	0.9392	69	<i>Viburnum prunifolium</i>	0.8332
30	<i>Cercocarpus parvifolius</i>	0.9365	70	<i>Ptelia trifoliata</i>	0.8319
31	<i>Eugenia buxifolia</i>	0.9360	71	<i>Pyrus rivularis</i>	0.8316
32	<i>Chrysophyllum oliviforme</i>	0.9300	72	<i>Quercus lyrata</i>	0.8313
33	<i>Drypetes crocea</i> , var. <i>latifolia</i>	0.9346	73	<i>Ostrya Virginica</i>	0.8284
34	<i>Heteromeles arbutifolia</i>	0.9326	74	<i>Quercus agrifolia</i>	0.8253
35	<i>Dipholis salicifolia</i>	0.9316	75	<i>Carya tomentosa</i>	0.8218
36	<i>Exostema Caribæum</i>	0.9310	76	<i>Carya porcina</i>	0.8217
37	<i>Quercus Emoryi</i>	0.9263	77	<i>Colubrina reclinata</i>	0.8208
38	<i>Leucena glauca</i>	0.9235	78	<i>Prunus umbellata</i>	0.8202
39	<i>Drypetes crocea</i>	0.9209	79	<i>Cornus florida</i>	0.8153
40	<i>Ximenia Americana</i>	0.9196	80	<i>Sapindus marginatus</i>	0.8126

Relative Order.	Species.	Specific Gravity.	Relative Order.	Species.	Specific Gravity.
81	<i>Osmanthus Americanus</i>	0.8111	136	<i>Quercus coccinea</i>	0.7405
82	<i>Carya sulcata</i>	0.8108	137	<i>Gleditschia monosperma</i>	0.7342
83	<i>Robinia viscosa</i>	0.8094	138	<i>Robinia Pseudacacia</i>	0.7333
84	<i>Bourreria Havauensis</i>	0.8073	139	<i>Quercus nigra</i>	0.7324
85	<i>Quercus Michauxii</i>	0.8039	140	<i>Viburnum Lentago</i>	0.7303
86	<i>Robinia Neo-Mexicana</i>	0.8034	141	<i>Quercus Catesbæi</i>	0.7294
87	<i>Carya myristicæformis</i>	0.8016	142	<i>Bumelia tenax</i>	0.7293
88	<i>Quercus hypoleuca</i>	0.8009	143	<i>Cratægus cordata</i>	0.7293
89	<i>Bumelia cuneata</i>	0.7959	144	<i>Celtis occidentalis</i>	0.7287
90	<i>Cratægus subvillosa</i>	0.7953	145	<i>Carpinus Caroliniana</i>	0.7286
91	<i>Pinus serotina</i>	0.7942	146	<i>Swietenia Mahogoni</i>	0.7282
92	<i>Rhus Metopium</i>	0.7917	147	<i>Celtis occidentalis, var. reticulata</i>	0.7275
93	<i>Diospyros Virginiana</i>	0.7908	148	<i>Ilex Cassine</i>	0.7270
94	<i>Fraxinus Greggii</i>	0.7904	149	<i>Ulmus racemosa</i>	0.7263
95	<i>Prunus Capuli</i>	0.7879	150	<i>Ulmus crassifolia</i>	0.7245
96	<i>Quercus Wislizeni</i>	0.7855	151	<i>Quercus aquatica</i>	0.7244
97	<i>Amelanchier Canadensis</i>	0.7838	152	<i>Prunus Americana</i>	0.7215
98	<i>Cratægus flava</i>	0.7809	153	<i>Cratægus Crus-galli</i>	0.7194
99	<i>Schæfferia frutescens</i>	0.7745	154	<i>Fraxinus quadrangulata</i>	0.7184
100	<i>Maclura aurantiaca</i>	0.7736	155	<i>Carya olivæformis</i>	0.7180
101	<i>Morus microphylla</i>	0.7715	156	<i>Thrinax argentea</i>	0.7172
102	<i>Chrysobalanus Icaco</i>	0.7709	157	<i>Kalmia latifolia</i>	0.7160
103	<i>Cratægus rivularis</i>	0.7703	158	<i>Cratægus spatululata</i>	0.7159
104	<i>Nectandra Willdenoviana</i>	0.7693	159	<i>Fremontia Californica</i>	0.7142
105	<i>Cratægus flava var. pubescens</i>	0.7683	160	<i>Laguncularia racemosa</i>	0.7137
106	<i>Quercus laurifolia</i>	0.7673	161	<i>Juniperus occidentalis, var. mono-</i> <i>sperma</i>	0.7118
107	<i>Quercus bicolor</i>	0.7662	162	<i>Fraxinus viridis</i>	0.7117
108	<i>Prosopis juliflora</i>	0.7652	163	<i>Cordia Sebestena</i>	0.7108
109	<i>Fraxinus Americana, var. Texensis</i>	0.7636	164	<i>Arbutus Xalapensis</i>	0.7099
110	<i>Betula lenta</i>	0.7617	165	<i>Arbutus Menziesii</i>	0.7052
111	<i>Vaccinium arboreum</i>	0.7610	166	<i>Pyrus coronaria</i>	0.7048
112	<i>Prosopis pubescens</i>	0.7609	167	<i>Quercus tinctoria</i>	0.7045
113	<i>Cratægus tomentosa</i>	0.7585	168	<i>Pinus palustris</i>	0.6999
114	<i>Carya amara</i>	0.7552	169	<i>Capparis Jamaicensis</i>	0.6971
115	<i>Quercus imbricaria</i>	0.7529	170	<i>Ulmus fulva</i>	0.6956
116	<i>Cercis reniformis</i>	0.7513	171	<i>Prunus demissa</i>	0.6951
117	<i>Pinus Cubensis</i>	0.7504	172	<i>Cratægus Douglasii</i>	0.6950
118	<i>Arbutus Texana</i>	0.7500	173	<i>Jacquinia armillaris</i>	0.6948
119	<i>Audromeda ferruginea</i>	0.7500	174	<i>Quercus palustris</i>	0.6938
120	<i>Quercus Prinus</i>	0.7499	175	<i>Gymnocladus Canadensis</i>	0.6934
121	<i>Ulmus alata</i>	0.7491	176	<i>Quercus falcata</i>	0.6928
122	<i>Cornus Nuttallii</i>	0.7481	177	<i>Acer saccharinum, var. nigrum</i>	0.6915
123	<i>Quercus Phellos</i>	0.7472	178	<i>Acer saccharinum</i>	0.6912
124	<i>Quercus alba</i>	0.7470	179	<i>Juniperus occidentalis, var. con-</i> <i>jugens</i>	0.6907
125	<i>Bumelia lycioides</i>	0.7467	180	<i>Acer grandidentatum</i>	0.6902
126	<i>Oxydendrum arboreum</i>	0.7458	181	<i>Pyrus angustifolia</i>	0.6895
127	<i>Cratægus apiifolia</i>	0.7453	182	<i>Canotia holocantha</i>	0.6885
128	<i>Quercus macrocarpa</i>	0.7453	183	<i>Prunus angustifolia</i>	0.6884
129	<i>Quercus Garryana</i>	0.7449	184	<i>Fagus ferruginea</i>	0.6883
130	<i>Parkinsonia microphylla</i>	0.7449	185	<i>Hamamelis Virginica</i>	0.6856
131	<i>Xanthoxylum Pterota</i>	0.7444	186	<i>Quercus heterophylla</i>	0.6834
132	<i>Ilex decidua</i>	0.7420	187	<i>Quercus densiflora</i>	0.6827
133	<i>Quercus lobata</i>	0.7409	188	<i>Fraxinus pistaciæfolia</i>	0.6810
134	<i>Carya aquatica</i>	0.7407			
135	<i>Larix occidentalis</i>	0.7407			

Relative Order.	Species.	Specific Gravity.	Relative Order.	Species.	Specific Gravity.
189	<i>Cratægus brachyacantha</i> . . .	0.6793	244	<i>Salix cordata</i> , var. <i>vestita</i> . . .	0.6069
190	<i>Cordia Boissieri</i> . . .	0.6790	245	<i>Oreodoxa regia</i> . . .	0.6034
191	<i>Cyrilla raceniiflora</i> . . .	0.6784	246	<i>Betula occidentalis</i> . . .	0.6030
192	<i>Abies bracteata</i> . . .	0.6783	247	<i>Acer glabrum</i> . . .	0.6028
193	<i>Gleditschia triacanthos</i> . . .	0.6740	248	<i>Rhamnus Californica</i> . . .	0.6000
194	<i>Leucæna pulverulenta</i> . . .	0.6732	249	<i>Thrinax parviflora</i> . . .	0.5990
195	<i>Myrica Californica</i> . . .	0.6703	250	<i>Xanthoxylum Clava-Herculis</i> , var. <i>fruticosum</i> . . .	0.5967
196	<i>Cornus alternifolia</i> . . .	0.6696	251	<i>Betula papyrifera</i> . . .	0.5955
197	<i>Yucca canaliculata</i> . . .	0.6677	252	<i>Pyrus sambucifolia</i> . . .	0.5928
198	<i>Acer circinatum</i> . . .	0.6660	253	<i>Liquidambar Styraciflua</i> . . .	0.5909
199	<i>Bumelia spinosa</i> . . .	0.6603	254	<i>Chilopsis saligna</i> . . .	0.5902
200	<i>Fraxinus anomala</i> . . .	0.6597	255	<i>Morus rubra</i> . . .	0.5898
201	<i>Euonymus atropurpureus</i> . . .	0.6592	256	<i>Byrsionima lucida</i> . . .	0.5888
202	<i>Cratægus æstivalis</i> . . .	0.6564	257	<i>Castanea pumila</i> . . .	0.5887
203	<i>Juglans rupestris</i> . . .	0.6554	258	<i>Ilex Dahoon</i> , var. <i>myrtifolia</i> . . .	0.5873
204	<i>Betula lutea</i> . . .	0.6553	259	<i>Juniperus pachyphloea</i> . . .	0.5829
205	<i>Bumelia lanuginosa</i> . . .	0.6544	260	<i>Prunus serotina</i> . . .	0.5822
206	<i>Fraxinus Americana</i> . . .	0.6543	261	<i>Ilex opaca</i> . . .	0.5818
207	<i>Quercus rubra</i> . . .	0.6540	262	<i>Pinus contorta</i> . . .	0.5816
208	<i>Parkinsonia Torreyana</i> . . .	0.6531	263	<i>Fraxinus viridis</i> , var. <i>Berlan-</i> <i>dieriana</i> . . .	0.5780
209	<i>Pisonia obtusata</i> . . .	0.6529	264	<i>Hippomane Mancinella</i> . . .	0.5772
210	<i>Umbellularia Californica</i> . . .	0.6517	265	<i>Juniperus occidentalis</i> . . .	0.5765
211	<i>Pinus cembroides</i> . . .	0.6512	266	<i>Betula nigra</i> . . .	0.5762
212	<i>Ulmus Americana</i> . . .	0.6506	267	<i>Betula alba</i> , var. <i>populifolia</i> . . .	0.5760
213	<i>Cratægus arborescens</i> . . .	0.6491	268	<i>Ceanothus thyrsiflorus</i> . . .	0.5750
214	<i>Ehretia elliptica</i> . . .	0.6440	269	<i>Fraxinus Oregana</i> . . .	0.5731
215	<i>Quercus Kelloggii</i> . . .	0.6435	270	<i>Halesia diptera</i> . . .	0.5705
216	<i>Persea Carolinensis</i> . . .	0.6429	271	<i>Platanus occidentalis</i> . . .	0.5678
217	<i>Rhus cotinoides</i> . . .	0.6425	272	<i>Pinus Parryana</i> . . .	0.5675
218	<i>Quercus cinerea</i> . . .	0.6420	273	<i>Rhamnus Purshiana</i> . . .	0.5672
219	<i>Lysiloma latisiliqua</i> . . .	0.6418	274	<i>Pinus monophylla</i> . . .	0.5658
220	<i>Ficus brevifolia</i> . . .	0.6398	275	<i>Xanthoxylum Americanum</i> . . .	0.5654
221	<i>Persea Carolinensis</i> , var. <i>palustris</i> . . .	0.6396	276	<i>Myrica cerifera</i> . . .	0.5637
222	<i>Taxus brevifolia</i> . . .	0.6391	277	<i>Halesia tetraptera</i> . . .	0.5628
223	<i>Pinus edulis</i> . . .	0.6388	278	<i>Salix lasiolepis</i> . . .	0.5587
224	<i>Chionanthus Virginica</i> . . .	0.6372	279	<i>Pinus clausa</i> . . .	0.5576
225	<i>Cercis Canadensis</i> . . .	0.6363	280	<i>Castanopsis chrysophylla</i> . . .	0.5574
226	<i>Magnolia grandiflora</i> . . .	0.6360	281	<i>Pinus Balfouriana</i> , var. <i>aristata</i> . . .	0.5572
227	<i>Nyssa sylvatica</i> . . .	0.6356	282	<i>Dalea spinosa</i> . . .	0.5536
228	<i>Forestiera acuminata</i> . . .	0.6345	283	<i>Juniperus Californica</i> , var. <i>Uta-</i> <i>liensis</i> . . .	0.5522
229	<i>Taxus Florida</i> . . .	0.6340	284	<i>Rhamnus Caroliniana</i> . . .	0.5462
230	<i>Ungnadia speciosa</i> . . .	0.6332	285	<i>Acer rubrum</i> , var. <i>Drummondii</i> . . .	0.5459
231	<i>Crescentia cucurbitina</i> . . .	0.6319	286	<i>Pinus Chihuahuana</i> . . .	0.5457
232	<i>Fraxinus sambucifolia</i> . . .	0.6318	287	<i>Pyrus Americana</i> . . .	0.5451
233	<i>Rhododendron maximum</i> . . .	0.6303	288	<i>Pinus Taeda</i> . . .	0.5441
234	<i>Juniperus Californica</i> . . .	0.6282	289	<i>Pinus Balfouriana</i> . . .	0.5434
235	<i>Cladrastis tinctoria</i> . . .	0.6278	290	<i>Salix flavescens</i> , var. <i>Sculeriana</i> . . .	0.5412
236	<i>Cupressus macrocarpa</i> . . .	0.6261	291	<i>Pinckneya pubens</i> . . .	0.5350
237	<i>Fraxinus pubescens</i> . . .	0.6251	292	<i>Salix Hookeriana</i> . . .	0.5350
238	<i>Cliftonia ligustrina</i> . . .	0.6249	293	<i>Salix longifolia</i> , var. <i>exigua</i> . . .	0.5342
239	<i>Larix Americana</i> . . .	0.6236	294	<i>Acer spicatum</i> . . .	0.5320
240	<i>Acer rubrum</i> . . .	0.6178	295	<i>Symplocos tinctoria</i> . . .	0.5325
241	<i>Parkinsonia aculeata</i> . . .	0.6116			
242	<i>Juglans nigra</i> . . .	0.6115			
243	<i>Pinus mitis</i> . . .	0.6104			

Relative Order.	Species.	Specific Gravity.	Relative Order.	Species.	Specific Gravity.
296	Magnolia macrophylla	0.5300	351	Populus Fremontii, var. Wislizenii	0.4621
297	Pinus inops	0.5309	352	Chamaecyparis Lawsoniana	0.4621
298	Acer Pennsylvanicum	0.5299	353	Sambucus Mexicana	0.4614
299	Planera aquatica	0.5294	354	Nyssa capitata	0.4613
300	Rhus copallina	0.5273	355	Alnus incana	0.4607
301	Acer dasycarpum	0.5269	356	Salix lasiandra, var. Fendleriana	0.4598
302	Pinus Jeffreyi	0.5206	357	Picea nigra	0.4584
303	Nyssa uniflora	0.5194	358	Pinus insignis	0.4674
304	Rhus copallina, var. lanceolata .	0.5184	359	Pseudotsuga Douglasii, var. macrocarpa	0.4563
305	Tsuga Mertensiana	0.5182	360	Abies nobilis	0.4561
306	Washingtonia filifera	0.5173	361	Salix lasiandra, var. lancifolia .	0.4547
307	Pseudotsuga Douglasii	0.5157	362	Taxodium distichum	0.4543
308	Pinus rigida	0.5151	363	Jesculus glabra	0.4542
309	Torreya taxifolia	0.5145	364	Tilia Americana	0.4525
310	Sambucus glauca	0.5087	365	Salix amygdaloides	0.4500
311	Salix Sitchensis	0.5072	366	Castanea vulgaris, var. Americana	0.4504
312	Xanthoxylum Clava-Herculis .	0.5056	367	Prunus emarginata, var. mollis .	0.4502
313	Anona laurifolia	0.5053	368	Magnolia Umbrella	0.4487
314	Sassafras officinale	0.5042	369	Catalpa bignonioides	0.4474
315	Pinus Arizonica	0.5038	370	Yucca elata	0.4470
316	Magnolia glauca	0.5035	371	Salix nigra	0.4466
317	Prunus Pennsylvanica	0.5023	372	Tsuga Pattoniana	0.4454
318	Magnolia Fraseri	0.5003	373	Sabal Palmetto	0.4404
319	Alnus maritima	0.4996	374	Salix sessilifolia	0.4397
320	Jesculus Californica	0.4980	375	Rhus venenata	0.4382
321	Salix flavescens	0.4969	376	Pinus flexilis	0.4358
322	Pinus muricata	0.4942	377	Rhus typhina	0.4357
323	Pinus pungens	0.4935	378	Negundo aceroides	0.4328
324	Salix longifolia	0.4930	379	Picea Sitchensis	0.4287
325	Juniperus Virginiana	0.4926	380	Tsuga Caroliniana	0.4275
326	Populus Fremontii	0.4914	381	Jesculus flava	0.4274
327	Acer macrophyllum	0.4909	382	Salix discolor	0.4261
328	Platanus racemosa	0.4880	383	Tilia heterophylla	0.4253
329	Pinus Torreyana	0.4879	384	Tsuga Canadensis	0.4239
330	Pinus reflexa	0.4877	385	Liriodendron Tulipifera	0.4230
331	Salix laevigata	0.4872	386	Abies amabilis	0.4228
332	Pinus resinosa	0.4854	387	Sequoia sempervirens	0.4208
333	Cupressus Guadalupensis	0.4843	388	Catalpa speciosa	0.4165
334	Pinus Sabinaiana	0.4840	389	Pinus albicaulis	0.4165
335	Negundo Californicum	0.4821	390	Populus balsamifera, var. candicans	0.4161
336	Alnus rubra	0.4813	391	Magnolia cordata	0.4139
337	Ilex Dahoon	0.4806	392	Simaruba glauca	0.4136
338	Chamaecyparis Nutkaensis	0.4782	393	Pinus Coulteri	0.4133
339	Pinus Banksiana	0.4761	394	Alnus rhombifolia	0.4127
340	Torreya Californica	0.4760	395	Pinus Murrayana	0.4096
341	Salix lasiandra	0.4756	396	Populus heterophylla	0.4089
342	Ficus pedunculata	0.4739	397	Juglans cinerea	0.4086
343	Platanus Wrightii	0.4730	398	Tilia Americana, var. pubescens	0.4074
344	Gordonia Lasianthus	0.4728	399	Picea alba	0.4061
345	Pinus ponderosa	0.4715	400	Populus tremuloides	0.4032
346	Abies magnifica	0.4701	401	Libocedrus decurrens	0.4017
347	Magnolia acuminata	0.4690	402	Alnus oblongifolia	0.3981
348	Cupressus Goveiana	0.4680	403	Asimina triloba	0.3969
349	Alnus serrulata	0.4666	404	Pinus glabra	0.3931
350	Populus grandidentata	0.4632			

Relative Order.	Species.	Specific Gravity.	Relative Order.	Species.	Specific Gravity.
405	<i>Populus angustifolia</i>	0.3912	418	<i>Abies grandis</i>	0.3545
406	<i>Pinus monticola</i>	0.3908	419	<i>Fraxinus platycarpa</i>	0.3541
407	<i>Populus monilifera</i>	0.3889	420	<i>Pinus tuberculata</i>	0.3400
408	<i>Pinus Strobus</i>	0.3854	421	<i>Abies subalpina</i>	0.3476
409	<i>Abies balsamea</i>	0.3819	422	<i>Picea Engelmanni</i>	0.3449
410	<i>Populus trichocarpa</i>	0.3814	423	<i>Chamæcyparis sphæroidea</i>	0.3322
411	<i>Thuja gigantea</i>	0.3796	424	<i>Cereus giganteus</i>	0.3188
412	<i>Picea pungens</i>	0.3740	425	<i>Thuja occidentalis</i>	0.3104
413	<i>Yucca brevifolia</i>	0.3737	426	<i>Bursera gummiifera</i>	0.3003
414	<i>Pinus Lambertiana</i>	0.3684	427	<i>Sequoia gigantea</i>	0.2882
415	<i>Abies concolor</i>	0.3638	428	<i>Yucca baccata</i>	0.2724
416	<i>Populus balsamifera</i>	0.3635	429	<i>Ficus aurea</i>	0.2616
417	<i>Abies Fraseri</i>	0.3565			

TABLE III.

The Principal Trees of the United States arranged in the Order of the Relative Approximate Fuel Value of their Dry Woods.

Relative Order.	Species.	Relative Approximate Fuel Value.	Relative Order.	Species.	Relative Approximate Fuel Value.
1	Condalia ferrea	1.1938	41	Leucæna glauca	0.8931
2	Rhizophora Mangle	1.1406	42	Prunus sphaerocarpa	0.8920
3	Guaiacum sanctum	1.1338	43	Eugenia dichotoma	0.8917
4	Vauquelinia Torreyi	1.1209	44	Avicennia nitida	0.8909
5	Condalia obovata	1.1155	45	Quercus Douglasii	0.8863
6	Portiera angustifolia	1.1044	46	Pithecolobium Unguis cati	0.8826
7	Eugenia longipes	1.0844	47	Xanthoxylum Caribæum	0.8820
8	Cercocarpus ledifolius	1.0619	48	Myginda pallens	0.8739
9	Sebastiania lucida	1.0602	49	Calyptanthus Chytraculia	0.8693
10	Mimusops Sieberi	1.0555	50	Citharexylum villosum	0.8665
11	Amyris sylvatica	1.0397	51	Prunus Caroliniana	0.8652
12	Reynosa latifolia	1.0372	52	Drypetes crocea	0.8644
13	Olneya Tesota	1.0359	53	Eysenhardtia orthocarpa	0.8628
14	Genipa clusæifolia	1.0207	54	Cratægus coccinea	0.8585
15	Quercus grisea	0.9908	55	Drypetes crocea, var. latifolia	0.8571
16	Conocarpus erecta	0.9868	56	Quercus prinoides	0.8507
17	Prunus ilicifolia	0.9727	57	Acacia Greggii	0.8472
18	Canella alba	0.9720	58	Sophora affinis	0.8448
19	Sophora secundiflora	0.9686	59	Quercus chrysolepis	0.8442
20	Sideroxylon Mastichodendron	0.9589	60	Ardisia Pickeringia	0.8444
21	Coccoloba uvifera	0.9503	61	Piscidia Erythrina	0.8439
22	Quercus reticulata	0.9430	62	Quercus undulata, var. Gambellii	0.8324
23	Hypelate paniculata	0.9414	63	Carya alba	0.8311
24	Quercus virens	0.9393	64	Quercus obtusiloba	0.8301
25	Coccoloba Floridana	0.9340	65	Ptelea trifoliata	0.8294
26	Quercus Durandii	0.9338	66	Viburnum prunifolium	0.8289
27	Acacia Wrightii	0.9333	67	Pyrus rivularis	0.8282
28	Cercocarpus parvifolius	0.9323	68	Myrsine Rapanea	0.8271
29	Exostema Caribæum	0.9289	69	Quercus lyrata	0.8269
30	Dipholis salicifolia	0.9286	70	Guetarda elliptica	0.8250
31	Heteromeles arbutifolia	0.9276	71	Ostrya Virginica	0.8248
32	Chrysophyllum oliviforme	0.9244	72	Prunus umbellata	0.8192
33	Eugenia buxifolia	0.9220	73	Diospyros Texana	0.8178
34	Eugenia procera	0.9205	74	Quercus agrifolia	0.8147
35	Quercus oblongifolia	0.9195	75	Carya porcina	0.8136
36	Ximenia Americana	0.9129	76	Carya tomentosa	0.8131
37	Quercus Emoryi	0.9044	77	Cornus florida	0.8098
38	Quercus rubra, var. Texana	0.9003	78	Robinia viscosa	0.8078
39	Eugenia monticola	0.8983	79	Osmanthus Americanus	0.8074
40	Hypelate trifoliata	0.8976	80	Colubrina reclinata	0.8064

Relative Order.	Species.	Relative Approximate Fuel Value.	Relative Order.	Species.	Relative Approximate Fuel Value.
81	<i>Carya sulcata</i>	0.8035	136	<i>Carya aquatica</i>	0.7313
82	<i>Sapindus marginatus</i>	0.8004	137	<i>Robinia Pseudacacia</i>	0.7296
83	<i>Sapindus Saponaria</i>	0.8004	138	<i>Gleditschia monosperma</i>	0.7288
84	<i>Quercus Michauxii</i>	0.8003	139	<i>Viburnum Lentago</i>	0.7282
85	<i>Robinia Neo-Mexicana</i>	0.7986	140	<i>Cratægus cordata</i>	0.7259
86	<i>Carya myristicæformis</i>	0.7931	141	<i>Quercus nigra</i>	0.7239
87	<i>Pinus serotina</i>	0.7928	142	<i>Bumelia tenax</i>	0.7236
88	<i>Quercus hypoleuca</i>	0.7902	143	<i>Quercus Catesbæi</i>	0.7231
89	<i>Cratægus subvillosa</i>	0.7898	144	<i>Carpinus Caroliniana</i>	0.7226
90	<i>Prunus Capuli</i>	0.7863	145	<i>Ulmus racemosa</i>	0.7219
91	<i>Bourreria Havanensis</i>	0.7848	146	<i>Celtis occidentalis</i>	0.7208
92	<i>Diospyros Virginiana</i>	0.7832	147	<i>Ilex Cassine</i>	0.7207
93	<i>Fraxinus Greggii</i>	0.7830	148	<i>Quercus aquatica</i>	0.7207
94	<i>Bumelia cuneata</i>	0.7808	149	<i>Swietenia Mahogoni</i>	0.7203
95	<i>Amelanchier Canadensis</i>	0.7795	150	<i>Prunus Americana</i>	0.7202
96	<i>Quercus Wislizeni</i>	0.7775	151	<i>Celtis occidentalis, var. reticulata</i>	0.7186
97	<i>Cratægus flava</i>	0.7748	152	<i>Parkinsonia microphylla</i>	0.7178
98	<i>Rhus Metopium</i>	0.7728	153	<i>Ulmus crassifolia</i>	0.7158
99	<i>Maclura aurantiaca</i>	0.7683	154	<i>Cratægus Crus-galli</i>	0.7154
100	<i>Cratægus rivularis</i>	0.7676	155	<i>Kalmia latifolia</i>	0.7131
101	<i>Morus microphylla</i>	0.7663	156	<i>Fraxinus quadrangulata</i>	0.7128
102	<i>Nectandra Willdenoviana</i>	0.7647	157	<i>Cratægus spathulata</i>	0.7112
103	<i>Quercus tomentosa, var. punctata</i>	0.7645	158	<i>Carya olivæformis</i>	0.7099
104	<i>Chrysobalanus Icaco</i>	0.7642	159	<i>Arbutus Xalapensis</i>	0.7081
105	<i>Quercus bicolor</i>	0.7618	160	<i>Fraxinus viridis</i>	0.7071
106	<i>Cratægus flava, var. pubescens</i>	0.7613	161	<i>Juniperus occidentalis, var. monosperma</i>	0.7062
107	<i>Quercus laurifolia</i>	0.7610	162	<i>Quercus tinctoria</i>	0.7025
108	<i>Betula lenta</i>	0.7597	163	<i>Arbutus Menziesii</i>	0.7024
109	<i>Fraxinus Americana, var. Texensis</i>	0.7583	164	<i>Fremontia Californica</i>	0.7021
110	<i>Vaccinium arboreum</i>	0.7580	165	<i>Laguncularia racemosa</i>	0.7021
111	<i>Schæfferia frutescens</i>	0.7548	166	<i>Pyrus coronaria</i>	0.7011
112	<i>Cratægus tomentosa</i>	0.7546	167	<i>Pinus palustris</i>	0.6982
113	<i>Prosopis pubescens</i>	0.7537	168	<i>Thrinax argentea</i>	0.6956
114	<i>Quercus imbricaria</i>	0.7497	169	<i>Cratægus Douglasii</i>	0.6927
115	<i>Prosopis juliflora</i>	0.7485	170	<i>Prunus demissa</i>	0.6916
116	<i>Pinus Cubensis</i>	0.7484	171	<i>Quercus falcata</i>	0.6911
117	<i>Carya amara</i>	0.7474	172	<i>Ulmus fulva</i>	0.6898
118	<i>Andromeda ferruginea</i>	0.7465	173	<i>Gymnocladus Canadensis</i>	0.6888
119	<i>Arbutus Texana</i>	0.7462	174	<i>Quercus palustris</i>	0.6882
120	<i>Cercis reniformis</i>	0.7455	175	<i>Acer saccharinum</i>	0.6875
121	<i>Cornus Nuttallii</i>	0.7444	176	<i>Juniperus occidentalis, var. conjugens</i>	0.6875
122	<i>Quercus Prinus</i>	0.7441	177	<i>Pyrus angustifolia</i>	0.6872
123	<i>Quercus alba</i>	0.7439	178	<i>Acer saccharinum, var. nigrum</i>	0.6866
124	<i>Quercus Phellos</i>	0.7435	179	<i>Prunus angustifolia</i>	0.6865
125	<i>Oxydendrum arboreum</i>	0.7430	180	<i>Acer grandidentatum</i>	0.6858
126	<i>Quercus Garryana</i>	0.7424	181	<i>Fagus ferruginea</i>	0.6848
127	<i>Ulmus alata</i>	0.7417	182	<i>Hamamelis Virginica</i>	0.6831
128	<i>Bumelia lycioides</i>	0.7407	183	<i>Quercus heterophylla</i>	0.6822
129	<i>Quercus macrocarpa</i>	0.7400	184	<i>Cordia Sebestena</i>	0.6808
130	<i>Larix occidentalis</i>	0.7400	185	<i>Fraxinus pistaciæfolia</i>	0.6768
131	<i>Quercus coccinea</i>	0.7391	186	<i>Cratægus brachyacantha</i>	0.6764
132	<i>Quercus lobata</i>	0.7387	187	<i>Cyrilla racemiflora</i>	0.6756
133	<i>Xanthoxylum Pterota</i>	0.7386	188	<i>Quercus densiflora</i>	0.6725
134	<i>Cratægus apiifolia</i>	0.7381			
135	<i>Ilex decidua</i>	0.7368			

Relative Order.	Species.	Relative Approximate Fuel Value.	Relative Order.	Species.	Relative Approximate Fuel Value.
189	<i>Jacquinia armillaris</i>	0.6708	244	<i>Pisonia obtusata</i>	0.6031
190	<i>Gleditschia triacanthos</i>	0.6686	245	<i>Betula occidentalis</i>	0.6012
191	<i>Myrica Californica</i>	0.6681	246	<i>Acer glabrum</i>	0.6010
192	<i>Cornus alternifolia</i>	0.6669	247	<i>Parkinsonia aculeata</i>	0.5974
193	<i>Leucena pulverulenta</i>	0.6664	248	<i>Rhamnus Californica</i>	0.5965
194	<i>Abies bracteata</i>	0.6645	249	<i>Betula papyrifera</i>	0.5940
195	<i>Capparis Jamaicensis</i>	0.6639	250	<i>Xanthoxylum Clava-Herculis</i> , var.	
196	<i>Acer circinatum</i>	0.6634		fruticosum	0.5922
197	<i>Euonymus atropurpureus</i>	0.6554	251	<i>Pyrus sambucifolia</i>	0.5908
198	<i>Cordia Boissieri</i>	0.6550	252	<i>Oreodoxa regia</i>	0.5901
199	<i>Fraxinus anomala</i>	0.6541	253	<i>Castanea pumila</i>	0.5880
200	<i>Betula lutea</i>	0.6533	254	<i>Chilopsis saligna</i>	0.5880
201	<i>Crategus aestivalis</i>	0.6527	255	<i>Liquidambar Styraciflua</i>	0.5873
202	<i>Quercus rubra</i>	0.6523	256	<i>Morus rubra</i>	0.5856
203	<i>Bumelia spinosa</i>	0.6521	257	<i>Juniperus pachyphloea</i>	0.5823
204	<i>Cnortia lolacantha</i>	0.6518	258	<i>Ilex Dalman</i> , var. <i>myrtifolia</i>	0.5820
205	<i>Fraxinus Americana</i>	0.6516	259	<i>Prunus serotina</i>	0.5813
206	<i>Umbellularia Californica</i>	0.6492	260	<i>Pinus contorta</i>	0.5804
207	<i>Juglans rupestris</i>	0.6488	261	<i>Ilex opaca</i>	0.5774
208	<i>Bumelia lanuginosa</i>	0.6464	262	<i>Juniperus occidentalis</i>	0.5768
209	<i>Parkinsonia Torreyana</i>	0.6458	263	<i>Thrinax parviflora</i>	0.5762
210	<i>Crategus arborescens</i>	0.6455	264	<i>Fraxinus viridis</i> , var. <i>Berlandieri-</i>	
211	<i>Ulmus Americana</i>	0.6454		riana	0.5749
212	<i>Pinus cembroides</i>	0.6453	265	<i>Betula alba</i> , var. <i>populifolia</i>	0.5743
213	<i>Quercus Kelloggii</i>	0.6418	266	<i>Byrsonima lucida</i>	0.5743
214	<i>Rhus cotinoides</i>	0.6393	267	<i>Betula nigra</i>	0.5742
215	<i>Persea Carolinensis</i>	0.6380	268	<i>Fraxinus Oregona</i>	0.5712
216	<i>Taxus brevifolia</i>	0.6377	269	<i>Ceanothus thyrsiflorus</i>	0.5710
217	<i>Persea Carolinensis</i> , var. <i>palustris</i>	0.6372	270	<i>Halesia diptera</i>	0.6681
218	<i>Ehretia elliptica</i>	0.6355	271	<i>Platanus occidentalis</i>	0.6652
219	<i>Pinus edulis</i>	0.6348	272	<i>Pinus Parryana</i>	0.6644
220	<i>Quercus cinerea</i>	0.6342	273	<i>Rhamnus Purshiana</i>	0.6634
221	<i>Chionanthus Virginica</i>	0.6340	274	<i>Xanthoxylum Americanum</i>	0.6622
222	<i>Taxus Florida</i>	0.6327	275	<i>Pinus monophylla</i>	0.6620
223	<i>Magnolia grandiflora</i>	0.6326	276	<i>Myrica cerifera</i>	0.6608
224	<i>Nyssa sylvatica</i>	0.6323	277	<i>Halesia tetraptera</i>	0.6605
225	<i>Cercis Canadensis</i>	0.6317	278	<i>Pinus clausa</i>	0.6569
226	<i>Forestiera acuminata</i>	0.6299	279	<i>Pinus Balfouriana</i> , var. <i>aristata</i>	0.6555
227	<i>Lysiloma latifolia</i>	0.6282	280	<i>Castanopsis chrysophylla</i>	0.6554
228	<i>Rhododendron maximum</i>	0.6280	281	<i>Salix lasiolepis</i>	0.6532
229	<i>Fraxinus sambucifolia</i>	0.6273	282	<i>Juniperus Californica</i> , var. <i>Utahensis</i>	0.6495
230	<i>Cladrastis tinctoria</i>	0.6260	283	<i>Hippomane Mancinella</i>	0.6474
231	<i>Ungnadia speciosa</i>	0.6258	284	<i>Acer rubrum</i> , var. <i>Drummondii</i>	0.6440
232	<i>Yucca canaliculata</i>	0.6258	285	<i>Pinus Chihuahuana</i>	0.6436
233	<i>Fraxinus pubescens</i>	0.6235	286	<i>Pinus Taeda</i>	0.6427
234	<i>Juniperus Californica</i>	0.6235	287	<i>Rhamnus Caroliniana</i>	0.6427
235	<i>Crescentia cucurbitina</i>	0.6234	288	<i>Pinus Balfouriana</i>	0.6412
236	<i>Cupressus macrocarpa</i>	0.6225	289	<i>Pyrus Americana</i>	0.6406
237	<i>Cliftonia lignistrina</i>	0.6223	290	<i>Salix flavescens</i> , var. <i>Scouleriana</i>	0.6391
238	<i>Larix Americana</i>	0.6215	291	<i>Salix Hookeriiana</i>	0.6333
239	<i>Acer rubrum</i>	0.6155	292	<i>Pinckneya pubens</i>	0.6328
240	<i>Ficus brevifolia</i>	0.6119	293	<i>Dalea spinosa</i>	0.6312
241	<i>Pinus mitis</i>	0.6086	294	<i>Acer spicatum</i>	0.6307
242	<i>Juglans nigra</i>	0.6067	295	<i>Pinus inops</i>	0.6208
243	<i>Salix cordata</i> , var. <i>vestita</i>	0.6033			

Relative Order.	Species.	Relative Approximate Fuel Value.	Relative Order.	Species.	Relative Approximate Fuel Value.
296	Magnolia macrophylla	0.5200	351	Populus grandidentata	0.4611
297	Symplocos tinctoria	0.5289	352	Nyssa capitata	0.4597
298	Salix longifolia, var. exigua	0.5285	353	Alnus incana	0.4588
299	Acer Pennsylvanicum	0.5280	354	Salix lasiandra, var. Fendleriana	0.4572
300	Planera aquatica	0.5270	355	Picea nigra	0.4572
301	Acer dasycarpum	0.5252	356	Populus Fremontii, var. Wislizeni	0.4569
302	Rhus copallina	0.5241	357	Pinus insignis	0.4560
303	Pinus Jeffreyi	0.5192	358	Pseudotsuga Douglasii, var. macrocarpa	0.4550
304	Tsuga Mertensiana	0.5100	359	Abies nobilis	0.4545
305	Nyssa uniflora	0.5158	360	Taxodium distichum	0.4524
306	Pseudotsuga Douglasii	0.5153	361	Sambucus Mexicana	0.4522
307	Rhus copallina, var. lanceolata	0.5140	362	Ficus pedunculata	0.4506
308	Pinus rigida	0.5139	363	Æsculus glabra	0.4503
309	Torreya taxifolia	0.5107	364	Tilia Americana	0.4500
310	Washingtonia filifera	0.5075	365	Castanea vulgaris, var. Americana	0.4496
311	Salix Sitchensis	0.5042	366	Prunus emarginata, var. mollis	0.4493
312	Sassafras officinale	0.5037	367	Magnolia Umbrella	0.4478
313	Pinus Arizona	0.5028	368	Salix amygdaloides	0.4468
314	Xanthoxylum Clava-Herculis	0.5015	369	Catalpa bignonioides	0.4457
315	Magnolia glauca	0.5011	370	Tsuga Pattoniana	0.4434
316	Sambucus glauca	0.5007	371	Salix nigra	0.4425
317	Prunus Pennsylvanica	0.5003	372	Salix lasiandra, var. lancifolia	0.4411
318	Magnolia Fraseri	0.4989	373	Salix sessilifolia	0.4375
319	Alnus maritima	0.4977	374	Rhus venenata	0.4354
320	Æsculus Californica	0.4945	375	Pinus flexilis	0.4346
321	Salix flavescens	0.4930	376	Rhus typhina	0.4335
322	Pinus muricata	0.4920	377	Negundo aceroides	0.4282
323	Pinus pungens	0.4922	378	Picea Sitchensis	0.4280
324	Juniperus Virginiana	0.4920	379	Tsuga Caroliniana	0.4258
325	Salix longifolia	0.4906	380	Salix discolor	0.4243
326	Acer macrophyllum	0.4882	381	Æsculus flava	0.4231
327	Populus Fremontii	0.4876	382	Tilia heterophylla	0.4227
328	Pinus reflexa	0.4864	383	Liriodendron Tulipifera	0.4220
329	Pinus Torreyana	0.4862	384	Tsuga Canadensis	0.4220
330	Salix lævigata	0.4844	385	Abies amabilis	0.4218
331	Pinus resinosa	0.4841	386	Sequoia sempervirens	0.4202
332	Platanus racemosa	0.4826	387	Pinus albicaulis	0.4154
333	Cupressus Guadalupensis	0.4822	388	Catalpa speciosa	0.4149
334	Pinus Sabiniana	0.4821	389	Populus balsamifera, var. candicans	0.4142
335	Anona laurifolia	0.4807	390	Magnolia cordata	0.4126
336	Negundo Californicum	0.4795	391	Pinus Coulteri	0.4118
337	Alnus rubra	0.4793	392	Alnus rhombifolia	0.4104
338	Chamæcyparis Nutkaensis	0.4766	393	Simaruba glauca	0.4098
339	Ilex Dahoon	0.4762	394	Pinus Murrayana	0.4083
340	Pinus Banksiana	0.4750	395	Sabal Palmetto	0.4067
341	Salix lasiandra	0.4727	396	Juglans cinerea	0.4065
342	Pinus ponderosa	0.4698	397	Populus heterophylla	0.4056
343	Torreya Californica	0.4696	398	Yucca alata	0.4055
344	Gordonia Lasianthus	0.4692	399	Tilia Americana, var. pubescens	0.4048
345	Abies magnifica	0.4687	400	Picea alba	0.4038
346	Magnolia acuminata	0.4676	401	Libocedrus decurrens	0.4014
347	Platanus Wrightii	0.4672	402	Populus tremuloides	0.4010
348	Cupressus Goveniana	0.4668	403	Alnus oblongifolia	0.3964
349	Alnus serrulata	0.4648	404	Asimina triloba	0.3961
350	Chamæcyparis Lawsoniana	0.4616			

Relative Order.	Species.	Relative Approximate Fuel Value.	Relative Order.	Species.	Relative Approximate Fuel Value.
405	<i>Pinus glabra</i>	0.3913	418	<i>Abies Fraseri</i>	0.3546
406	<i>Pinus monticola</i>	0.3899	419	<i>Abies grandis</i>	0.3528
407	<i>Populus angustifolia</i>	0.3881	420	<i>Fraxinus platycarpa</i>	0.3515
408	<i>Populus monilifera</i>	0.3852	421	<i>Pinus tuberculata</i>	0.3487
409	<i>Pinus Strobus</i>	0.3847	422	<i>Abies subalpina</i>	0.3461
410	<i>Abies balsamea</i>	0.3802	423	<i>Picea Engelmanni</i>	0.3338
411	<i>Thuja gigantea</i>	0.3790	424	<i>Chamæcyparis sphæroidea</i>	0.3311
412	<i>Populus trichocarpa</i>	0.3766	425	<i>Thuja occidentalis</i>	0.3152
413	<i>Picea pungens</i>	0.3726	426	<i>Cereus giganteus</i>	0.3078
414	<i>Pinus Lambertiana</i>	0.3676	427	<i>Bursera gummiifera</i>	0.2942
415	<i>Populus balsamifera</i>	0.3611	428	<i>Sequoia gigantea</i>	0.2808
416	<i>Abies concolor</i>	0.3607	429	<i>Ficus aurea</i>	0.2484
417	<i>Yucca brevifolia</i>	0.3588	430	<i>Yucca baccata</i>	0.2480

TABLE IV.

The Principal Trees of the United States arranged in the Order of the Elasticity of their Woods (Coefficient of Elasticity, — Kilogram, Centimetre).

Relative Order.	Species.	Coefficient of Elasticity.	Relative Order.	Species.	Coefficient of Elasticity.
1	<i>Larix occidentalis</i>	165810	47	<i>Castanea pumila</i>	114108
2	<i>Rhizophora Mangle</i>	165567	48	<i>Quercus virens</i>	113627
3	<i>Betula lutea</i>	161723	49	<i>Coccoloba Floridana</i>	113538
4	<i>Pinus contorta</i>	158638	50	<i>Pinus resinosa</i>	113216
5	<i>Pinus Cubensis</i>	157747	51	<i>Pinus Tæda</i>	112847
6	<i>Eugenia buxifolia</i>	157510	52	<i>Quercus rubra</i>	112798
7	<i>Pinus palustris</i>	148733	53	<i>Quercus prinoides</i>	112461
8	<i>Carya nyristicæformis</i>	146484	54	<i>Chrysophyllum oliviforme</i>	112424
9	<i>Acer saccharinum</i>	146108	55	<i>Quercus palustris</i>	112296
10	<i>Betula lenta</i>	141308	56	<i>Canella alba</i>	111698
11	<i>Quercus falcata</i>	140151	57	<i>Populus trichocarpa</i>	111694
12	<i>Carya alba</i>	138889	58	<i>Betula nigra</i>	111322
13	<i>Pinus mitis</i>	137495	59	<i>Hypelate paniculata</i>	111144
14	<i>Tsuga Mertensiana</i>	137483	60	<i>Acer dasycarpum</i>	110973
15	<i>Ostrya Virginica</i>	137276	61	<i>Chrysobalanus Icaco</i>	110973
16	<i>Dipholis salicifolia</i>	133593	62	<i>Picea nigra</i>	109987
17	<i>Quercus lyrata</i>	133438	63	<i>Sideroxylon Mastichodendron</i>	109948
18	<i>Betula papyrifera</i>	130567	64	<i>Ulmus racemosa</i>	109628
19	<i>Robinia Pseudacacia</i>	129238	65	<i>Juglans nigra</i>	109200
20	<i>Pseudotsuga Douglasii</i>	128297	66	<i>Gleditschia triacanthos</i>	108579
21	<i>Abies nobilis</i>	127660	67	<i>Amyris sylvatica</i>	108507
22	<i>Salix flavescens, var. Scouleriana</i>	126216	68	<i>Acacia Greggii</i>	108507
23	<i>Larix Americana</i>	126126	69	<i>Eugenia monticola</i>	108507
24	<i>Abies amabilis</i>	126013	70	<i>Quercus coccinea</i>	108507
25	<i>Quercus laurifolia</i>	125016	71	<i>Alnus incana</i>	108507
26	<i>Citharexylum villosum</i>	125717	72	<i>Salix flavescens</i>	108507
27	<i>Quercus Pinus</i>	125473	73	<i>Fraxinus Americana, var. Texensis</i>	108174
28	<i>Osmanthus Americannus</i>	123133	74	<i>Cupressus macrocarpa</i>	107327
29	<i>Quercus aquatica</i>	122657	75	<i>Umbellularia Californica</i>	106708
30	<i>Quercus heterophylla</i>	122494	76	<i>Swietenia Mahogoni</i>	106272
31	<i>Chamaecyparis Lawsoniana</i>	121772	77	<i>Alnus rubra</i>	106046
32	<i>Fagus ferruginea</i>	120906	78	<i>Populus Fremontii</i>	105116
33	<i>Quercus chrysolepis</i>	119810	79	<i>Pseudotsuga Douglasii, var. macrocarpa</i>	105007
34	<i>Amelanchier Canadensis</i>	119677	80	<i>Rhus Metopium</i>	105007
35	<i>Exostema Caribæum</i>	119357	81	<i>Reynosa latifolia</i>	105005
36	<i>Quercus imbricaria</i>	119357	82	<i>Gymnocladus Canadensis</i>	104822
37	<i>Pinus muricata</i>	119357	83	<i>Drypetes crocea</i>	103890
38	<i>Eugenia procera</i>	119111	84	<i>Carya sulcata</i>	103884
39	<i>Gleditschia monosperma</i>	116991	85	<i>Quercus Catesbæi</i>	103468
40	<i>Pinus serotina</i>	116957	86	<i>Quercus tinctoria</i>	103427
41	<i>Magnolia macrophylla</i>	116854	87	<i>Thuya gigantea</i>	103372
42	<i>Carya tomentosa</i>	114995	88	<i>Quercus rubra, var. Texana</i>	103343
43	<i>Robinia Neo-Mexicana</i>	114889	89	<i>Carya porcina</i>	103300
44	<i>Carpinus Caroliniana</i>	114881	90	<i>Taxodium distichum</i>	103206
45	<i>Condalia ferrea</i>	114316			
46	<i>Pinus Coulteri</i>	114108			

Relative Order.	Species.	Coefficient of Elasticity.	Relative Order.	Species.	Coefficient of Elasticity.
91	Cornus Nuttallii	103081	147	Salix lasiandra, var. lancifolia .	87935
92	Carya amara	102980	148	Fraxinus sambucifolia	87185
93	Chamæcyparis Nutkaensis	102881	149	Ohneya Tesota	86822
94	Acer saccharinum, var. nigrum	102726	150	Celtis occidentalis, var. reticulata	86805
95	Conocarpus erecta	102411	151	Xanthoxylum Caribæum	86755
96	Picea alba	102280	152	Platanus occidentalis	86402
97	Fraxinus Americana	101068	153	Liquidambar Styraciflua	86388
98	Carya aquatica	101261	154	Guaiacum sanctum	86324
99	Castanopsis chrysophylla	101195	155	Prunus emarginata, var. mollis	86055
100	Minusops Sieberi	100226	156	Quercus Wislizeni	86055
101	Cladrastis tinctoria	100226	157	Prunus serotina	85883
102	Bourreria Havanensis	99049	158	Quercus oblongifolia	85739
103	Populus monilifera	99417	159	Populus balsamifera	85690
104	Myrica Californica	99161	160	Castanea vulgaris, var. Americana	85621
105	Picea Sitchensis	99001	161	Pinus Strobus	85093
106	Pinus insignis	97850	162	Piscidia Erythrina	85079
107	Sophora affinis	97694	163	Persea Carolinensis, var. palustris	84918
108	Colubrina reclinata	97656	164	Fraxinus Oregana	84818
109	Quercus nigra	97656	165	Libocedrus decurrens	84729
110	Abies Fraseri	97170	166	Tilia heterophylla	84659
111	Quercus alba	97089	167	Alnus rhombifolia	84580
112	Quercus Michauxii	96373	168	Populus Fremontii, var. Wislizeni	84317
113	Quercus densiflora	96347	169	Tilia Americana	84010
114	Populus grandidentata	96327	170	Persea Carolinensis	83900
115	Abies grandis	95838	171	Arbutus Menziesii	83834
116	Quercus agrifolia	95276	172	Quercus Durandii	83766
117	Ulmus fulva	95274	173	Sapindus marginatus	83681
118	Pinus monticola	95068	174	Drypetes crocea, var. latifolia	83619
119	Negundo Californicum	94532	175	Quercus obtusiloba	83257
120	Magnolia Fraseri	94462	176	Torreya taxifolia	82833
121	Quercus hypoleuca	94409	177	Prunus Americana	82659
122	Maclura aurantiaca	94373	178	Prosopis pubescens	82424
123	Acer rubrum	94284	179	Morus rubra	82377
124	Pinus Banksiana	94231	180	Pinus Arizona	82370
125	Magnolia cordata	94073	181	Catalpa speciosa	82156
126	Prunus Caroliniana	93727	182	Cornus florida	82112
127	Simaruba glauca	93217	183	Abies balsamea	81924
128	Quercus macrocarpa	92929	184	Nyssa sylvatica	81832
129	Magnolia acuminata	92817	185	Populus tremuloides	81441
130	Pinus Jeffreyi	92777	186	Andromeda ferruginea	81280
131	Liriodendron Tulipifera	92667	187	Juglans cinerea	81253
132	Betula occidentalis	92424	188	Fraxinus pubescens	81222
133	Magnolia glauca	91230	189	Tilia Americana, var. pubescens	81111
134	Pinus reflexa	91287	190	Quercus Garryana	81109
135	Rhamnus Purshiana	91268	191	Picea Engelmanni	80791
136	Abies concolor	90889	192	Pinus pungens	80330
137	Viburnum prunifolium	90654	193	Gordonia Lasianthus	79414
138	Quercus bicolor	90636	194	Pinus Lambertiana	79375
139	Magnolia grandiflora	90330	195	Cratægus arborescens	78837
140	Fraxinus viridis	90313	196	Quercus Phellos	78440
141	Cratægus subvillosa	90023	197	Cliftonia ligustrina	78250
142	Tsuga Canadensis	89970	198	Diospyros Virginiana	78234
143	Oxydendrum arboreum	88851	199	Bumelia lycioides	78125
144	Myrica cerifera	88778	200	Acer macrophyllum	78032
145	Salix lasiolepis	88778	201	Tsuga Pattoniana	77524
146	Pinus ponderosa	88731			

Relative Order.	Species.	Coefficient of Elasticity.	Relative Order.	Species.	Coefficient of Elasticity.
202	<i>Fraxinus quadrangulata</i>	77439	256	<i>Symplocos tinctoria</i>	62202
203	<i>Quercus Douglasii</i>	77100	257	<i>Arbutus Xalapensis</i>	61577
204	<i>Pinus Murrayana</i>	77113	258	<i>Juniperus pachyphloea</i>	61276
205	<i>Alnus oblongifolia</i>	76937	259	<i>Prunus angustifolia</i>	60281
206	<i>Prunus demissa</i>	76895	260	<i>Bumelia cuneata</i>	60281
207	<i>Abies subalpina</i>	76190	261	<i>Fraxinus pistaciæfolia</i>	60119
208	<i>Taxus brevifolia</i>	76133	262	<i>Pinus Balfouriana</i>	59386
209	<i>Bumelia tenax</i>	75120	263	<i>Cratægus æstivalis</i>	59186
210	<i>Quercus cinerea</i>	75120	264	<i>Pinus Sabiniana</i>	58517
211	<i>Ulmus Americana</i>	74742	265	<i>Kalmia latifolia</i>	58484
212	<i>Quercus Kelloggii</i>	74488	266	<i>Prosopis juliflora</i>	58297
213	<i>Magnolia Umbrella</i>	74305	267	<i>Negundo aceroides</i>	58156
214	<i>Rhamnus Caroliniana</i>	74084	268	<i>Pinus rigida</i>	58127
215	<i>Quercus grisea</i>	73982	269	<i>Quercus undulata</i> , var. <i>Gambellii</i>	57162
216	<i>Rhus copallina</i>	73647	270	<i>Washingtonia filifera</i>	56346
217	<i>Juniperus occidentalis</i> , var. <i>conjugens</i>	73426	271	<i>Parkinsonia Torreyana</i>	55839
218	<i>Prunus ilicifolia</i>	73201	272	<i>Picea pungens</i>	55360
219	<i>Cratægus tomentosa</i>	73160	273	<i>Planera aquatica</i>	55167
220	<i>Populus balsamifera</i> , var. <i>canadensis</i>	73024	274	<i>Chilopsis saligna</i>	54421
221	<i>Betula alba</i> , var. <i>populifolia</i>	72970	275	<i>Pinus clausa</i>	54295
222	<i>Juglans rupestris</i>	72632	276	<i>Pinus inops</i>	54295
223	<i>Xanthoxylum Clava-Herculis</i>	72577	277	<i>Pinus Torreyana</i>	54218
224	<i>Pinus Chilualuana</i>	72575	278	<i>Thuya occidentalis</i>	53311
225	<i>Laguncularia racemosa</i>	72396	279	<i>Byrsonima lucida</i>	52503
226	<i>Populus heterophylla</i>	72338	280	<i>Ulmus alata</i>	52323
227	<i>Acer circinatum</i>	71810	281	<i>Sassafras officinale</i>	51910
228	<i>Quercus lobata</i>	71604	282	<i>Nyssa uniflora</i>	51678
229	<i>Pinus Balfouriana</i> , var. <i>aristata</i>	71482	283	<i>Salix amygdaloides</i>	50144
230	<i>Tsuga Caroliniana</i>	71282	284	<i>Anona laurifolia</i>	50113
231	<i>Cratægus flava</i> , var. <i>pubescens</i>	70765	285	<i>Cupressus Goveniana</i>	49041
232	<i>Ulmus crassifolia</i>	70399	286	<i>Cyrilla racemifolia</i>	48828
233	<i>Forestiera acuminata</i>	70282	287	<i>Salix lævigata</i>	48828
234	<i>Cercis Canadensis</i>	68798	288	<i>Bumelia lanuginosa</i>	48334
235	<i>Celtis occidentalis</i>	68527	289	<i>Asimina triloba</i>	48179
236	<i>Halesia diptera</i>	68321	290	<i>Fraxinus platycarpa</i>	47637
237	<i>Pinckneya pubens</i>	68201	291	<i>Pisonia obtusata</i>	45508
238	<i>Æsculus Californica</i>	68216	292	<i>Lysiloma latissilqua</i>	46064
239	<i>Catalpa bignonioides</i>	68161	293	<i>Populus angustifolia</i>	45847
240	<i>Nyssa capitata</i>	68083	294	<i>Platanus Wrightii</i>	45644
241	<i>Sequoia sempervirens</i>	67646	295	<i>Sequoia gigantea</i>	45146
242	<i>Pinus flexilis</i>	67531	296	<i>Pinus glabra</i>	44750
243	<i>Cratægus spathulata</i>	67349	297	<i>Pinus monophylla</i>	43488
244	<i>Juniperus Virginiana</i>	66992	298	<i>Pinus tuberculata</i>	42870
245	<i>Carya olivæformis</i>	66646	299	<i>Pinus edulis</i>	42094
246	<i>Cratægus Crus-galli</i>	66436	300	<i>Bursera gummiifera</i>	41694
247	<i>Abies magnifica</i>	66220	301	<i>Ficus pedunculata</i>	40690
248	<i>Rhododendron maximum</i>	64578	302	<i>Chamecyparis spherioidea</i>	40410
249	<i>Æsculus glabra</i>	64438	303	<i>Torreya Californica</i>	40146
250	<i>Ilex opaca</i>	64317	304	<i>Ehretia elliptica</i>	39697
251	<i>Pyrus coronaria</i>	64241	305	<i>Salix nigra</i>	39062
252	<i>Ilex Dahoon</i>	64192	306	<i>Pinus albicaulis</i>	38147
253	<i>Quercus Emoryi</i>	63828	307	<i>Pinus Parryana</i>	37783
254	<i>Pyrus sambucifolia</i>	62600	308	<i>Sambucus glauca</i>	36517
255	<i>Platanus racemosa</i>	62401	309	<i>Salix lasiandra</i> , var. <i>Fendleriana</i>	36517
			310	<i>Ficus aurea</i>	25699

TABLE V.

The Principal Trees of the United States arranged in the Order of the Strength of their Woods (Modulus of Rupture, — Kilogram, Centimetre).

Relative Order.	Species.	Modulus of Rupture	Relative Order.	Species.	Modulus of Rupture.
1	<i>Carya myristicæformis</i>	1394	45	<i>Cupressus macrocarpa</i>	1045
2	<i>Amyris sylvatica</i>	1305	46	<i>Quercus nigra</i>	1043
3	<i>Robinia Pseudacacia</i>	1273	47	<i>Quercus tinctoria</i>	1041
4	<i>Quercus chrysolepis</i>	1268	48	<i>Pinus mitis</i>	1038
5	<i>Betula lutea</i>	1248	49	<i>Myrica Californica</i>	1036
6	<i>Quercus prinoides</i>	1238	50	<i>Quercus Prinus</i>	1031
7	<i>Larix occidentalis</i>	1227	51	<i>Pinus muricata</i>	1031
8	<i>Quercus imbricaria</i>	1218	52	<i>Gleditschia monosperma</i>	1027
9	<i>Colubrina reclinata</i>	1216	53	<i>Canella alba</i>	1026
10	<i>Betula lenta</i>	1216	54	<i>Quercus lyrata</i>	1025
11	<i>Rhizophora Mangle</i>	1207	55	<i>Quercus rubra</i> , var. <i>Texana</i>	1024
12	<i>Carya alba</i>	1200	56	<i>Acer dasycarpum</i>	1019
13	<i>Quercus falcata</i>	1193	57	<i>Quercus virens</i>	1017
14	<i>Hypelate paniculata</i>	1190	58	<i>Exostema Caribæum</i>	1005
15	<i>Quercus laurifolia</i>	1181	59	<i>Swietenia Mahogoni</i>	1003
16	<i>Eugenia procera</i>	1176	60	<i>Quercus Douglasii</i>	993
17	<i>Eugenia monticola</i>	1172	61	<i>Quercus Durandii</i>	993
18	<i>Pinus Cubensis</i>	1172	62	<i>Quercus cinerea</i>	993
19	<i>Pinus serotina</i>	1164	63	<i>Pinus contorta</i>	993
20	<i>Pinus palustris</i>	1152	64	<i>Cornus Nuttallii</i>	991
21	<i>Acer saccharinum</i>	1149	65	<i>Castanea pumila</i>	991
22	<i>Carpinus Caroliniana</i>	1149	66	<i>Quercus rubra</i>	989
23	<i>Dipholis salicifolia</i>	1148	67	<i>Quercus Phellos</i>	989
24	<i>Fagus ferruginea</i>	1148	68	<i>Quercus macrocarpa</i>	982
25	<i>Ostrya Virginica</i>	1134	69	<i>Betula nigra</i>	972
26	<i>Amelanchier Canadensis</i>	1132	70	<i>Sideroxylon Mastichodendron</i>	970
27	<i>Maclura aurantiaca</i>	1131	71	<i>Acer saccharinum</i> , var. <i>nigrum</i>	962
28	<i>Carya tomentosa</i>	1129	72	<i>Chrysobalanus Icaco</i>	961
29	<i>Fraxinus Americana</i> , var. <i>Texensis</i>	1125	73	<i>Viburnum prunifolium</i>	951
30	<i>Quercus Michauxii</i>	1118	74	<i>Quercus densiflora</i>	946
31	<i>Quercus hypoleuca</i>	1113	75	<i>Bourreria Havanensis</i>	944
32	<i>Carya amara</i>	1101	76	<i>Conocarpus erecta</i>	942
33	<i>Quercus palustris</i>	1090	77	<i>Citharexylum villosum</i>	937
34	<i>Carya sulcata</i>	1083	78	<i>Quercus grisea</i>	937
35	<i>Taxus brevifolia</i>	1078	79	<i>Quercus agrifolia</i>	935
36	<i>Quercus heterophylla</i>	1073	80	<i>Prunus Caroliniana</i>	928
37	<i>Ulmus racemosa</i>	1068	81	<i>Gleditschia triacanthos</i>	923
38	<i>Betula papyrifera</i>	1065	82	<i>Mimusops Sieberi</i>	914
39	<i>Eugenia buxifolia</i>	1055	83	<i>Coccoloba Floridana</i>	918
40	<i>Quercus coccinea</i>	1054	84	<i>Robinia Neo-Mexicana</i>	900
41	<i>Quercus aquatica</i>	1052	85	<i>Quercus bicolor</i>	900
42	<i>Osmanthus Americanus</i>	1051	86	<i>Salix flavescens</i> , var. <i>Scouleriana</i>	900
43	<i>Quercus Catesbei</i>	1046	87	<i>Tsuga Mertensiana</i>	900
44	<i>Carya porcina</i>	1046	88	<i>Arbutus Menziesii</i>	907

Relative Order.	Species.	Modulus of Rapture.	Relative Order.	Species.	Modulus of Rapture.
89	<i>Quercus alba</i>	905	144	<i>Prunus ilicifolia</i>	782
90	<i>Condalia ferrea</i>	904	145	<i>Pinus Sabiniana</i>	779
91	<i>Cornus florida</i>	904	146	<i>Betula alba</i> , var. <i>populifolia</i>	778
92	<i>Cladrastis tinctoria</i>	902	147	<i>Morus rubra</i>	775
93	<i>Persea Carolinensis</i>	902	148	<i>Ulmus crassifolia</i>	773
94	<i>Larix Americana</i>	901	149	<i>Gymnocladus Canadensis</i>	771
95	<i>Fraxinus viridis</i>	895	150	<i>Populus monilifera</i>	770
96	<i>Prosopis pubescens</i>	894	151	<i>Pinus reflexa</i>	770
97	<i>Chamaecyparis Lawsoniana</i>	888	152	<i>Quercus Kelloggii</i>	768
98	<i>Torreya taxifolia</i>	887	153	<i>Acer circinatum</i>	766
99	<i>Carya aquatica</i>	884	154	<i>Juniperus pachyphloea</i>	761
100	<i>Pinus Taeda</i>	883	155	<i>Pinus Coulteri</i>	761
101	<i>Pseudotsuga Douglasii</i>	881	156	<i>Pinus Torreyana</i>	756
102	<i>Diospyros Virginiana</i>	879	157	<i>Xanthoxylum Caribæum</i>	754
103	<i>Quercus Garryana</i>	879	158	<i>Piscidia Erythrina</i>	752
104	<i>Quercus obtusiloba</i>	872	159	<i>Rhamnus Purshiana</i>	750
105	<i>Fraxinus pubescens</i>	869	160	<i>Oleaya Tesota</i>	750
106	<i>Ulmus fulva</i>	869	161	<i>Thuja gigantea</i>	749
107	<i>Prunus Americana</i>	864	162	<i>Picea nigra</i>	747
108	<i>Quercus lobata</i>	864	163	<i>Picea alba</i>	747
109	<i>Abies nobilis</i>	862	164	<i>Pinus Jeffreyi</i>	744
110	<i>Fraxinus Americana</i>	861	165	<i>Castanopsis chrysophylla</i>	741
111	<i>Chrysophyllum oliviforme</i>	857	166	<i>Juniperus Virginiana</i>	740
112	<i>Halesia diptera</i>	857	167	<i>Pinus insignis</i>	740
113	<i>Juglans nigra</i>	856	168	<i>Pinus rigida</i>	739
114	<i>Ulmus Americana</i>	852	169	<i>Cratægus subvillosa</i>	738
115	<i>Pseudotsuga Douglasii</i> , var. <i>macrocarpa</i>	846	170	<i>Magnolia glauca</i>	736
116	<i>Sapindus marginatus</i>	843	171	<i>Tsuga Canadensis</i>	736
117	<i>Pinus Chihuahuana</i>	832	172	<i>Oxydendrum arboreum</i>	728
118	<i>Nyssa sylvatica</i>	830	173	<i>Cercis Canadensis</i>	726
119	<i>Prunus serotina</i>	829	174	<i>Pinus pungens</i>	726
120	<i>Reynosa latifolia</i>	820	175	<i>Cratægus flava</i> , var. <i>pubescens</i>	724
121	<i>Persea Carolinensis</i> , var. <i>palustris</i>	820	176	<i>Ulmus alata</i>	724
122	<i>Alnus incana</i>	820	177	<i>Ehretia elliptica</i>	721
123	<i>Quercus Wislizeni</i>	818	178	<i>Populus grandidentata</i>	721
124	<i>Myrica cerifera</i>	815	179	<i>Pinus ponderosa</i>	720
125	<i>Salix lasiolepis</i>	813	180	<i>Quercus oblongifolia</i>	719
126	<i>Acer rubrum</i>	811	181	<i>Tsuga Pattoniana</i>	719
127	<i>Sophora affinis</i>	811	182	<i>Forestiera acuminata</i>	717
128	<i>Fraxinus quadrangulata</i>	811	183	<i>Cratægus æstivalis</i>	712
129	<i>Alnus rubra</i>	811	184	<i>Cratægus tomentosa</i>	709
130	<i>Salix flavescens</i>	808	185	<i>Magnolia Fraseri</i>	707
131	<i>Fraxinus sambucifolia</i>	808	186	<i>Drypetes crocea</i> , var. <i>latifolia</i>	707
132	<i>Umbellularia Californica</i>	806	187	<i>Abies concolor</i>	703
133	<i>Betula occidentalis</i>	806	188	<i>Quercus Emoryi</i>	703
134	<i>Celtis occidentalis</i> , var. <i>reticulata</i>	805	189	<i>Abies magnifica</i>	701
135	<i>Chamaecyparis Nutkaensis</i>	801	190	<i>Populus Fremontii</i>	698
136	<i>Pinus resinosa</i>	800	191	<i>Magnolia macrophylla</i>	696
137	<i>Negundo Californicum</i>	796	192	<i>Castanea vulgaris</i> , var. <i>Americana</i>	696
138	<i>Drypetes crocea</i>	796	193	<i>Prunus demissa</i>	691
139	<i>Magnolia grandiflora</i>	792	194	<i>Populus Fremontii</i> , var. <i>Wislizeni</i>	691
140	<i>Acacia Greggii</i>	792	195	<i>Ilex opaca</i>	686
141	<i>Abies amabilis</i>	792	196	<i>Alnus oblongifolia</i>	686
142	<i>Celtis occidentalis</i>	789	197	<i>Acer macrophyllum</i>	684
143	<i>Gualiacum sanctum</i>	787	198	<i>Nyssa capitata</i>	682
			199	<i>Alnus rhombifolia</i>	682

Relative Order.	Species.	Modulus of Rapture.	Relative Order.	Species.	Modulus of Rapture.
200	Libocedrus decurrens	682	256	Picea Engelmanni	574
201	Taxodium distichum	682	257	Ilex Dalhousii	572
202	Quercus undulata, var. Gambellii	680	258	Rhamnus Caroliniana	567
203	Prunus emarginata, var. mollis	679	259	Simaruba glauca	565
204	Andromeda ferruginea	679	260	Pinus Murrayana	564
205	Populus tremuloides	677	261	Bumelia lycioides	562
206	Salix lasiandra, var. lancifolia	675	262	Platanus racemosa	562
207	Bumelia tenax	673	263	Tilia Americana, var. pubescens	560
208	Magnolia acuminata	671	264	Lysiloma latifolia	553
209	Gordonia Lasianthus	670	265	Salix amygdaloides	550
210	Fraxinus Oregana	665	266	Populus balsamifera	550
211	Salix lasiocarpa	665	267	Parkinsonia Torreyana	546
212	Rhus copallina	663	268	Cupressus Goveniana	539
213	Rhododendron maximum	663	269	Fraxinus platycarpa	536
214	Pinus inops	658	270	Negundo aceroides	529
215	Liriodendron Tulipifera	657	271	Cliftonia ligustrina	526
216	Rhus Metopium	656	272	Laguncularia racemosa	518
217	Nyssa uniflora	655	273	Bumelia cuneata	515
218	Crataegus Crus-galli	653	274	Abies balsamea	515
219	Pinus Balfouriana, var. aristata	653	275	Thuja occidentalis	512
220	Pinus Arizona	653	276	Crataegus spathulata	506
221	Pinus Banksiana	652	277	Pinus clausa	502
222	Liquidambar Styraciflua	651	278	Pinus glabra	496
223	Picea Sitichensis	649	279	Æsculus glabra	494
224	Salix lasigata	644	280	Abies grandis	494
225	Populus heterophylla	642	281	Prosopis juliflora	485
226	Xanthoxylum Clava-Herculis	640	282	Pyrus coronaria	485
227	Kalmia latifolia	639	283	Abies subalpina	473
228	Abies Fraseri	639	284	Salix lasiandra, var. Fendleriana	469
229	Æsculus Californica	635	285	Prunus angustifolia	468
230	Catalpa speciosa	635	286	Juniperus occidentalis, var. con- jugens	468
231	Platanus occidentalis	635	287	Tsuga Caroliniana	461
232	Pinus Strobus	626	288	Sequoia gigantea	459
233	Pinus flexilis	624	289	Chamaecyparis sphaeroides	456
234	Fraxinus pistaciæfolia	622	290	Picea pungens	454
235	Crataegus arborescens	621	291	Pinus edulis	447
236	Planera aquatica	621	292	Pyrus sambucifolia	445
237	Symplocos tinctoria	619	293	Washingtonia filifera	429
238	Arbutus Xalapensis	618	294	Platanus Wrightii	428
239	Pinus monticola	609	295	Pinus Parryana	426
240	Populus balsamifera, var. candicans	609	296	Byronima lucida	424
241	Anona laurifolia	607	297	Salix nigra	424
242	Sassafras officinale	602	298	Pinus Balfouriana	424
243	Magnolia cordata	600	299	Pinus tuberculata	409
244	Juglans rupestris	600	300	Pinckneya pubens	405
245	Juglans cinerea	597	301	Populus angustifolia	400
246	Sequoia sempervirens	597	302	Asimina triloba	391
247	Pinus Lambertiana	597	303	Bumelia lanuginosa	387
248	Catalpa bignonioides	590	304	Sambucus glauca	370
249	Tilia Americana	589	305	Cyrilla racemiflora	314
250	Magnolia Umbrella	583	306	Pisonia obtusata	297
251	Torreya Californica	583	307	Pinus monophylla	288
252	Pinus albicanlis	581	308	Ficus aurea	239
253	Chilopsis saligna	578	309	Ficus pedunculata	230
254	Carya olivæformis	578	310	Bursera gummiifera	148
255	Tilia heterophylla	577			

TABLE VI.

The Principal Trees of the United States arranged in the Order of the Power of their Woods to resist Longitudinal Compression.

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
1	<i>Eugenia buxifolia</i>	887	39	<i>Carya tomentosa</i>	593
2	<i>Rhizophora Mangle</i>	860	40	<i>Viburnum prunifolium</i>	592
3	<i>Reynosia latifolia</i>	839	41	<i>Ulmus racemosa</i>	592
4	<i>Maclura aurantiaca</i>	809	42	<i>Prosopis juliflora</i>	588
5	<i>Condalia ferrea</i>	803	43	<i>Prunus Americana</i>	588
6	<i>Canella alba</i>	782	44	<i>Gleditschia monosperma</i>	584
7	<i>Coccoloba Floridana</i>	771	45	<i>Juglans nigra</i>	583
8	<i>Exostema Caribæum</i>	751	46	<i>Quercus rubra</i> , var. <i>Texana</i>	582
9	<i>Amyris sylvatica</i>	748	47	<i>Carya porcina</i>	577
10	<i>Acacia Greggii</i>	743	48	<i>Bourreria Havanensis</i>	575
11	<i>Guaiaacum sanctum</i>	737	49	<i>Quercus prinoides</i>	575
12	<i>Dipholis salicifolia</i>	730	50	<i>Persea Carolinensis</i>	573
13	<i>Robinia Pseudacacia</i>	694	51	<i>Sophora affinis</i>	570
14	<i>Citharexylum villosum</i>	689	52	<i>Umbellularia Californica</i>	568
15	<i>Larix occidentalis</i>	689	53	<i>Prunus Caroliniana</i>	562
16	<i>Xanthoxylum Caribæum</i>	685	54	<i>Carya sulcata</i>	559
17	<i>Robinia Neo-Mexicana</i>	683	55	<i>Quercus Douglassii</i>	557
18	<i>Eugenia procera</i>	672	56	<i>Viburnum Lentago</i>	555
19	<i>Prosopis pubescens</i>	671	57	<i>Pinus contorta</i>	554
20	<i>Amelanchier Canadensis</i>	670	58	<i>Eugenia monticola</i>	553
21	<i>Hypelate paniculata</i>	666	59	<i>Quercus imbricaria</i>	552
22	<i>Swietenia Mahogoni</i>	666	60	<i>Acer saccharinum</i> , var. <i>nigrum</i>	550
23	<i>Pinus Cubensis</i>	664	61	<i>Prunus serotina</i>	547
24	<i>Cornus Nuttallii</i>	663	62	<i>Osmanthus Americanus</i>	547
25	<i>Cercocarpus ledifolius</i>	655	63	<i>Quercus virens</i>	547
26	<i>Sideroxylon Mastichodendron</i>	650	64	<i>Tsuga Mertensiana</i>	547
27	<i>Drypetes crocea</i>	650	65	<i>Quercus chryssolepis</i>	545
28	<i>Carya myristicæformis</i>	638	66	<i>Prunus ilicifolia</i>	544
29	<i>Pinus palustris</i>	629	67	<i>Ostrya Virginica</i>	542
30	<i>Carya alba</i>	625	68	<i>Fraxinus Americana</i> , var. <i>Texensis</i>	541
31	<i>Rhamnus Purshiana</i>	621	69	<i>Ulmus fulva</i>	539
32	<i>Acer saccharinum</i>	619	70	<i>Prunus Capuli</i>	538
33	<i>Betula lutea</i>	619	71	<i>Cratægus subvillosa</i>	538
34	<i>Betula lenta</i>	619	72	<i>Quercus Prinus</i>	538
35	<i>Conocarpus erecta</i>	599	73	<i>Larix Americana</i>	536
36	<i>Chrysophyllum oliviforme</i>	598	74	<i>Cladrastis tinctoria</i>	534
37	<i>Piscidia Erythrina</i>	597	75	<i>Cornus florida</i>	534
38	<i>Quercus falcata</i>	596	76	<i>Quercus Durandii</i>	534

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
77	Rhus Metopium	533	132	Salix flavescens, var. Scouleriana	468
78	Quercus Wislizenii	533	133	Abies amabilis	467
79	Myrica Californica	532	134	Liquidambar Styraciflua	466
80	Juniperus occidentalis, var. conjugens	532	135	Chamæcyparis Lawsoniana	466
81	Crataegus flava, var. pubescens	527	136	Acer rubrum	463
82	Quercus laurifolia	526	137	Fraxinus Americana	463
83	Carya amara	522	138	Quercus agrifolia	463
84	Fraxinus Oregana	520	139	Pseudotsuga Douglasii, var. macrocarpa	463
85	Drypetes crocea, var. latifolia	520	140	Prunus emarginata, var. mollis	460
86	Pseudotsuga Douglasii	519	141	Mimusops Sieberi	460
87	Quercus alba	511	142	Torreya taxifolia	460
88	Quercus rubra	511	143	Acer circinatum	459
89	Prunus demissa	510	144	Quercus Catesbaei	457
90	Pinus muricata	509	145	Crataegus spatulata	455
91	Quercus Garryana	505	146	Chamæcyparis Nutkaensis	455
92	Pinus serotina	505	147	Pinus resinosa	455
93	Quercus coccinea	504	148	Ulmus crassifolia	453
94	Diospyros Virginiana	503	149	Abies nobilis	453
95	Arbutus Menziesii	502	150	Bumelia tenax	452
96	Oxydendrum arboreum	501	151	Platanus occidentalis	450
97	Quercus tinctoria	501	152	Thuja gigantea	450
98	Quercus aquatica	501	153	Xanthoxylum Clava-Herculis	449
99	Gleditschia triacanthos	500	154	Laguncularia racemosa	449
100	Fraxinus quadrangulata	499	155	Ulmus alata	449
101	Prunus umbellata	498	156	Quercus Kelloggii	449
102	Crataegus arborescens	498	157	Quercus cinerea	448
103	Carpinus Caroliniana	498	158	Ulmus Americana	446
104	Quercus nigra	497	159	Crataegus tomentosa	445
105	Castanea pumila	495	160	Crataegus festivalis	445
106	Quercus lyrata	492	161	Myrica cerifera	445
107	Quercus macrocarpa	491	162	Rhamnus Caroliniana	444
108	Quercus palustris	491	163	Negundo Californicum	442
109	Quercus bicolor	490	164	Hypelate trifoliata	439
110	Magnolia macrophylla	489	165	Rhododendron maximum	439
111	Bumelia lycioides	489	166	Betula nigra	438
112	Pinus reflexa	489	167	Juglans rupestris	437
113	Andromeda ferruginea	487	168	Celtis occidentalis, var. reticulata	437
114	Quercus obtusiloba	487	169	Fraxinus pubescens	435
115	Betula papyrifera	487	170	Castanopsis chrysophylla	435
116	Carya aquatica	486	171	Abies magnifica	435
117	Taxus brevifolia	483	172	Halesia diptera	434
118	Magnolia grandiflora	482	173	Carya olivæformis	434
119	Acer dasycarpum	482	174	Quercus oblongifolia	434
120	Fraxinus viridis	482	175	Nyssa capitata	431
121	Quercus Michauxii	482	176	Crataegus Crus-galli	430
122	Lysiloma latissilqua	481	177	Kalmia latifolia	430
123	Rhus copallina, var. lanceolata	479	178	Salix Hookeriana	427
124	Quercus grisea	479	179	Pinus Teda	427
125	Bumelia cuneata	478	180	Simaruba glauca	426
126	Fagus ferruginea	478	181	Magnolia glauca	424
127	Pinus mitis	477	182	Quercus lobata	424
128	Quercus densiflora	475	183	Fraxinus sambucifolia	423
129	Sapindus marginatus	470	184	Taxodium distichum	423
130	Cercis Canadensis	469	185	Quercus Emoryi	422
131	Nyssa sylvatica	468			

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
186	<i>Celtis occidentalis</i>	421	241	<i>Pinus clausa</i>	377
187	<i>Morus rubra</i>	420	242	<i>Liriodendron Tulipifera</i>	372
188	<i>Ilex opaca</i>	419	243	<i>Populus Fremontii</i> , var. <i>Wislizeni</i>	372
189	<i>Pyrus coronaria</i>	419	244	<i>Cliftonia ligustrina</i>	371
190	<i>Magnolia Fraseri</i>	418	245	<i>Persea Carolinensis</i> , var. <i>palustris</i>	367
191	<i>Parkinsonia Torreyana</i>	417	246	<i>Pinus Coulteri</i>	367
192	<i>Quercus undulata</i> , var. <i>Gambellii</i>	417	247	<i>Magnolia Umbrella</i>	366
193	<i>Pinus Jeffreyi</i>	417	248	<i>Oleyna Tesota</i>	366
194	<i>Pinus insignis</i>	417	249	<i>Nyssa uniflora</i>	365
195	<i>Juniperus Virginiana</i>	416	250	<i>Abies balsamea</i>	365
196	<i>Sequoia sempervirens</i>	416	251	<i>Catalpa bignonioides</i>	364
197	<i>Magnolia acuminata</i>	415	252	<i>Bumelia lanuginosa</i>	362
198	<i>Alnus rubra</i>	415	253	<i>Pinus inops</i>	360
199	<i>Quercus heterophylla</i>	412	254	<i>Cupressus Goveniana</i>	359
200	<i>Magnolia cordata</i>	410	255	<i>Populus grandidentata</i>	358
201	<i>Salix flavescens</i>	408	256	<i>Alnus rhombifolia</i>	358
202	<i>Prunus Pennsylvanica</i>	407	257	<i>Æsculus Californica</i>	355
203	<i>Catalpa speciosa</i>	407	258	<i>Pinus rigida</i>	355
204	<i>Picea nigra</i>	407	259	<i>Pinus pungens</i>	354
205	<i>Tilia Americana</i> , var. <i>pubescens</i>	405	260	<i>Populus monilifera</i>	353
206	<i>Libocedrus decurrens</i>	403	261	<i>Picea Sitchensis</i>	353
207	<i>Tsuga Caroliniana</i>	403	262	<i>Torreya Californica</i>	351
208	<i>Prunus angustifolia</i>	402	263	<i>Ilex Dahoon</i>	349
209	<i>Arbutus Xalapensis</i>	401	264	<i>Pinus flexilis</i>	349
210	<i>Forestiera acuminata</i>	401	265	<i>Pinus edulis</i>	349
211	<i>Gymnocladus Canadensis</i>	400	266	<i>Tilia Americana</i>	348
212	<i>Vaccinium arboreum</i>	399	267	<i>Betula alba</i> , var. <i>populifolia</i>	348
213	<i>Pinus Banksiana</i>	396	268	<i>Abies Fraseri</i>	347
214	<i>Tilia heterophylla</i>	394	269	<i>Picea alba</i>	342
215	<i>Ungnadia speciosa</i>	394	270	<i>Salix lasiandra</i> , var. <i>lanceifolia</i>	341
216	<i>Planera aquatica</i>	394	271	<i>Pinus Strobus</i>	339
217	<i>Juglans cinerea</i>	392	272	<i>Pinus Parryana</i>	339
218	<i>Byrsonima lucida</i>	391	273	<i>Pinus Balfouriana</i>	337
219	<i>Betula occidentalis</i>	391	274	<i>Pinus Chiluhauana</i>	337
220	<i>Abies grandis</i>	391	275	<i>Pinus Sabiniana</i>	337
221	<i>Quercus Phellos</i>	390	276	<i>Pinus Lambertiana</i>	336
222	<i>Populus trichocarpa</i>	390	277	<i>Pinus monticola</i>	334
223	<i>Abies concolor</i>	390	278	<i>Pinus Murrayana</i>	333
224	<i>Sequoia gigantea</i>	388	279	<i>Pinus albicaulis</i>	331
225	<i>Gordonia Lasianthus</i>	387	280	<i>Populus tremuloides</i>	330
226	<i>Ehretia elliptica</i>	387	281	<i>Platanus Wrightii</i>	327
227	<i>Fraxinus pistaciæfolia</i>	385	282	<i>Pinus Balfouriana</i> , var. <i>aristata</i>	325
228	<i>Salix lasiolepis</i>	385	283	<i>Platanus racemosa</i>	324
229	<i>Symplocos tinctoria</i>	384	284	<i>Negundo aceroides</i>	322
230	<i>Tsuga Canadensis</i>	384	285	<i>Populus balsamifera</i>	320
231	<i>Pyrus sambucifolia</i>	383	286	<i>Salix levigata</i>	319
232	<i>Sassafras officinale</i>	382	287	<i>Æsculus glabra</i>	313
233	<i>Acer macrophyllum</i>	381	288	<i>Pisonia obtusata</i>	310
234	<i>Castanea vulgaris</i> , var. <i>Americana</i>	381	289	<i>Thuya occidentalis</i>	306
235	<i>Pinus Arizona</i>	381	290	<i>Anona laurifolia</i>	302
236	<i>Pinus ponderosa</i>	381	291	<i>Abies subalpina</i>	302
237	<i>Pyrus Americana</i>	380	292	<i>Chilopsis saligna</i>	297
238	<i>Tsuga Pattoniana</i>	379	293	<i>Quercus hypoleuca</i>	298
239	<i>Populus Fremontii</i>	378	294	<i>Pinus Torreyana</i>	290
240	<i>Rhus copallina</i>	377	295	<i>Alnus incana</i>	289

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
296	<i>Pinus glabra</i>	288	307	<i>Salix amygdaloides</i>	204
297	<i>Salix lasiandra</i> , var. <i>Fendleriana</i>	286	308	<i>Pinus tuberculata</i>	263
298	<i>Populus heterophylla</i>	283	309	<i>Chamæcyparis sphæroidea</i>	259
299	<i>Ficus pedunculata</i>	281	310	<i>Picea pungens</i>	258
300	<i>Alnus oblongifolia</i>	278	311	<i>Coccoloba uvifera</i>	258
301	<i>Populus balsamifera</i> , var. <i>candicans</i>	276	312	<i>Fraxinus platycarpa</i>	251
302	<i>Sambucus glauca</i>	275	313	<i>Washingtonia filifera</i>	227
303	<i>Pinus monophylla</i>	274	314	<i>Salix nigra</i>	213
304	<i>Pinckneya pubens</i>	272	315	<i>Asimina triloba</i>	212
305	<i>Populus angustifolia</i>	271	316	<i>Ficus aurea</i>	162
306	<i>Picea Engelmanni</i>	267	317	<i>Bursera gummiifera</i>	155

TABLE VII.

The Principal Trees of the United States arranged in the Order of the Power of their Woods to resist Indentation to the Depth of 1.27 Millimetres.

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
1	Guaiacum sanctum	703	39	Swietenia Mahogoni	309
2	Olneya Tesota	655	40	Citharexylum villosum	308
3	Condalia ferrea	649	41	Quercus Durandii	308
4	Reynosia latifolia	639	42	Prunus ilicifolia	305
5	Canella alba	573	43	Cornus florida	305
6	Amyris sylvatica	550	44	Carya porcina	301
7	Exostema Caribæum	481	45	Pinus serotina	296
8	Cercocarpus ledifolius	480	46	Bourreria Havanaensis	294
9	Rhizophora Mangle	462	47	Quercus rubra, var. Texana	291
10	Eugenia procera	444	48	Carya sulcata	288
11	Quercus oblongifolia	439	49	Bumelia cuneata	286
12	Quercus Emoryi	415	50	Quercus nigra	286
13	Eugenia monticola	408	51	Juniperus occidentalis, var. con- jugens	286
14	Drypetes crocea, var. latifolia	407	52	Amelanchier Canadensis	280
15	Eugenia buxifolia	396	53	Vaccinium arboreum	279
16	Coccoloba Floridana	394	54	Carya tomentosa	277
17	Hypelate trifoliata	384	55	Gleditschia monosperma	276
18	Chrysophyllum oliviforme	382	56	Quercus obtusiloba	276
19	Mimusops Sieberi	375	57	Diphollis salicifolia	274
20	Quercus Douglasii	374	58	Carya aquatica	274
21	Xanthoxylum Caribæum	373	59	Celtis occidentalis, var. reticulata	273
22	Conocarpus erecta	370	60	Sapindus marginatus	272
23	Quercus grisea	364	61	Prunus Capuli	272
24	Maclura aurantiaca	363	62	Quercus Wislizeni	272
25	Drypetes crocea	362	63	Quercus hypoleuca	272
26	Sideroxylon Mastichodendron	355	64	Robinia Neo-Mexicana	271
27	Prosopis juliflora	343	65	Carya alba	271
28	Prunus umbellata	342	66	Quercus prinoides	264
29	Piscidia Erythrina	337	67	Taxus brevifolia	264
30	Sophora affinis	334	68	Cratægus subvillosa	263
31	Prosopis pubescens	329	69	Kalmia latifolia	262
32	Diospyros Virginiana	324	70	Robinia Pseudacacia	258
33	Quercus virens	324	71	Acer saccharinum	257
34	Cratægus flava, var. pubescens	319	72	Ulmus crassifolia	255
35	Prunus Caroliniana	318	73	Ulmus alata	255
36	Quercus chrysolepis	317	74	Quercus undulata, var. Gambellii	255
37	Carya myristiceformis	315	75	Quercus laurifolia	253
38	Viburnum prunifolium	313			

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
76	<i>Acer saccharinum</i> , var. <i>nigrum</i> . . .	252	131	<i>Magnolia grandiflora</i>	197
77	<i>Quercus lyrata</i>	252	132	<i>Halesia diptera</i>	197
78	<i>Pyrus coronaria</i>	250	133	<i>Nyssa sylvatica</i>	196
79	<i>Arbutus Xalapensis</i>	247	134	<i>Juglans nigra</i>	196
80	<i>Osmanthus Americanus</i>	247	135	<i>Fagus ferruginea</i>	196
81	<i>Prunus demissa</i>	246	136	<i>Pinus Parryana</i>	195
82	<i>Cornus Nuttallii</i>	242	137	<i>Fraxinus sambucifolia</i>	194
83	<i>Carya amara</i>	242	138	<i>Rhamnus Purshiana</i>	192
84	<i>Cratægus tomentosa</i>	240	139	<i>Persea Carolinensis</i> , var. <i>palustris</i>	192
85	<i>Quercus Garryana</i>	240	140	<i>Rhododendron maximum</i>	191
86	<i>Cupressus macrocarpa</i>	237	141	<i>Quercus palustris</i>	190
87	<i>Quercus agrifolia</i>	235	142	<i>Myrica Californica</i>	188
88	<i>Quercus macrocarpa</i>	233	143	<i>Quercus lobata</i>	188
89	<i>Quercus Michauxii</i>	233	144	<i>Juniperus occidentalis</i>	186
90	<i>Carya olivæformis</i>	232	145	<i>Pinus Cubensis</i>	186
91	<i>Ostrya Virginica</i>	231	146	<i>Cratægus arborescens</i>	184
92	<i>Quercus Prinus</i>	230	147	<i>Cladrastis tinctoria</i>	183
93	<i>Ehretia elliptica</i>	229	148	<i>Cercis Canadensis</i>	182
94	<i>Quercus Catesbæi</i>	228	149	<i>Juglans rupestris</i>	182
95	<i>Parkinsonia Torreyana</i>	226	150	<i>Quercus heterophylla</i>	182
96	<i>Quercus imbricaria</i>	226	151	<i>Acer dasycarpum</i>	181
97	<i>Betula lenta</i>	226	152	<i>Bumelia tenax</i>	181
98	<i>Andromeda ferruginea</i>	225	153	<i>Morus rubra</i>	178
99	<i>Cratægus æstivalis</i>	224	154	<i>Cupressus Goveniana</i>	178
100	<i>Quercus densiflora</i>	224	155	<i>Quercus rubra</i>	177
101	<i>Fraxinus quadrangulata</i>	222	156	<i>Ilex opaca</i>	176
102	<i>Chrysobalanus Icaco</i>	221	157	<i>Acer rubrum</i>	176
103	<i>Quercus bicolor</i>	221	158	<i>Quercus Kelloggii</i>	174
104	<i>Bumelia lycioides</i>	220	159	<i>Lysiloma latifolia</i>	171
105	<i>Fraxinus viridis</i>	220	160	<i>Fraxinus Americana</i>	171
106	<i>Cratægus spathulata</i>	218	161	<i>Forestiera acuminata</i>	170
107	<i>Celtis occidentalis</i>	217	162	<i>Ulmus Americana</i>	170
108	<i>Quercus Phellos</i>	216	163	<i>Pinus monophylla</i>	169
109	<i>Quercus alba</i>	213	164	<i>Gleditschia triacanthos</i>	168
110	<i>Carpinus Caroliniana</i>	213	165	<i>Fraxinus Oregana</i>	166
111	<i>Prunus Americana</i>	213	166	<i>Platanus occidentalis</i>	165
112	<i>Pinus edulis</i>	212	167	<i>Acer macrophyllum</i>	162
113	<i>Byrsonima lucida</i>	210	168	<i>Nyssa uniflora</i>	161
114	<i>Cratægus Crus-galli</i>	210	169	<i>Betula lutea</i>	161
115	<i>Fraxinus pistaciæfolia</i>	210	170	<i>Gymnocladus Canadensis</i>	160
116	<i>Rhus Metopium</i>	209	171	<i>Bumelia lanuginosa</i>	160
117	<i>Arbutus Menziesii</i>	207	172	<i>Xanthoxylum Clava-Herculis</i>	159
118	<i>Ulmus racemosa</i>	206	173	<i>Symplocos tinctoria</i>	159
119	<i>Prunus serotina</i>	204	174	<i>Torreya taxifolia</i>	158
120	<i>Fraxinus pubescens</i>	204	175	<i>Pinus inops</i>	156
121	<i>Quercus coccinea</i>	202	176	<i>Nyssa capitata</i>	155
122	<i>Quercus tinctoria</i>	202	177	<i>Pinus Chihuahuana</i>	154
123	<i>Oxydendrum arboreum</i>	201	178	<i>Pinus palustris</i>	153
124	<i>Quercus falcata</i>	201	179	<i>Ulmus fulva</i>	150
125	<i>Quercus cinerea</i>	201	180	<i>Ungnadia speciosa</i>	149
126	<i>Acer circinatum</i>	200	181	<i>Laguncularia racemosa</i>	149
127	<i>Persea Carolinensis</i>	199	182	<i>Pinus contorta</i>	149
128	<i>Umbellularia Californica</i>	199	183	<i>Juniperus Virginiana</i>	148
129	<i>Fraxinus Americana</i> , var. <i>Te censis</i>	198	184	<i>Cliftonia ligustrina</i>	147
130	<i>Quercus aquatica</i>	198	185	<i>Pinus Balfouriana</i>	147

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
186	<i>Pinus Torreyana</i>	147	241	<i>Pinckneya pubens</i>	105
187	<i>Planera aquatica</i>	146	242	<i>Pinus Arizonica</i>	105
188	<i>Chilopsis saligna</i>	144	243	<i>Pinus insignis</i>	105
189	<i>Myrica cerifera</i>	144	244	<i>Tsuga Pattoniana</i>	104
190	<i>Salix lasiolepis</i>	140	245	<i>Prunus Pennsylvanica</i>	103
191	<i>Larix occidentalis</i>	139	246	<i>Magnolia glauca</i>	102
192	<i>Sambucus glauca</i>	138	247	<i>Pseudotsuga Douglasii</i> , var. <i>macrocarpa</i>	102
193	<i>Fraxinus platycarpa</i>	138	248	<i>Chamæcyparis Nutkaensis</i>	101
194	<i>Pinus Sabiniana</i>	138	249	<i>Tsuga Mertensiana</i>	101
195	<i>Rhamnus Caroliniana</i>	130	250	<i>Pinus Banksiana</i>	100
196	<i>Sassafras officinale</i>	134	251	<i>Populus Fremontii</i> , var. <i>Wislizeni</i>	100
197	<i>Pinus Balfouriana</i> , var. <i>aristata</i>	134	252	<i>Pseudotsuga Douglasii</i>	100
198	<i>Prunus angustifolia</i>	133	253	<i>Gordonia Lasianthus</i>	99
199	<i>Pinus rigida</i>	133	254	<i>Salix flavescens</i>	98
200	<i>Liquidambar Styraciflua</i>	132	255	<i>Libocedrus decurrens</i>	98
201	<i>Betula nigra</i>	132	256	<i>Abies magnifica</i>	96
202	<i>Pinus clausa</i>	131	257	<i>Platanus racemosa</i>	93
203	<i>Betula alba</i> , var. <i>populifolia</i>	129	258	<i>Salix nigra</i>	93
204	<i>Pinus mitis</i>	129	259	<i>Pinus Coulteri</i>	92
205	<i>Pinus reflexa</i>	128	260	<i>Juglans cinerea</i>	90
206	<i>Anona laurifolia</i>	127	261	<i>Magnolia cordata</i>	89
207	<i>Betula occidentalis</i>	127	262	<i>Magnolia macrophylla</i>	89
208	<i>Rhus copallina</i> , var. <i>lanceolata</i>	126	263	<i>Salix lasiandra</i> , var. <i>lanceifolia</i>	87
209	<i>Betula papyrifera</i>	126	264	<i>Simaruba glauca</i>	86
210	<i>Salix flavescens</i> , var. <i>Scouleriana</i>	126	265	<i>Catalpa speciosa</i>	86
211	<i>Tsuga Caroliniana</i>	125	266	<i>Populus Fremontii</i>	86
212	<i>Magnolia Fraseri</i>	123	267	<i>Populus heterophylla</i>	86
213	<i>Torreya Californica</i>	122	268	<i>Pinus Murrayana</i>	86
214	<i>Pinus muricata</i>	122	269	<i>Pinus tuberculata</i>	86
215	<i>Abies nobilis</i>	120	270	<i>Pinus resinosa</i>	85
216	<i>Ficus pedunculata</i>	119	271	<i>Magnolia Umbrella</i>	84
217	<i>Castanopsis chrysophylla</i>	119	272	<i>Populus monilifera</i>	83
218	<i>Castanea pumila</i>	118	273	<i>Liriodendron Tulipifera</i>	82
219	<i>Salix laevigata</i>	118	274	<i>Salix lasiandra</i> , var. <i>Fendleriana</i>	82
220	<i>Pyrus Americana</i>	117	275	<i>Chamæcyparis Lawsoniana</i>	82
221	<i>Platanus Wrightii</i>	117	276	<i>Tsuga Canadensis</i>	82
222	<i>Alnus rubra</i>	117	277	<i>Salix amygdaloides</i>	81
223	<i>Pinus Jeffreyi</i>	116	278	<i>Taxodium distichum</i>	81
224	<i>Pinus pungens</i>	115	279	<i>Prunus emarginata</i> , var. <i>mollis</i>	80
225	<i>Ilex Daliou</i>	113	280	<i>Populus tremuloides</i>	80
226	<i>Larix Americana</i>	112	281	<i>Picea pungens</i>	79
227	<i>Negundo aceroides</i>	111	282	<i>Alnus rhombifolia</i>	78
228	<i>Salix Hookeriana</i>	111	283	<i>Pinus Lambertiana</i>	78
229	<i>Rhus copallina</i>	109	284	<i>Abies concolor</i>	78
230	<i>Æsculus Californica</i>	108	285	<i>Catalpa bignonioides</i>	77
231	<i>Pisonia obtusata</i>	108	286	<i>Picea nigra</i>	77
232	<i>Pinus flexilis</i>	108	287	<i>Sequoia sempervirens</i>	77
233	<i>Magnolia acuminata</i>	107	288	<i>Populus angustifolia</i>	76
234	<i>Negundo Californicum</i>	107	289	<i>Picea Engelmanni</i>	76
235	<i>Pyrus sambucifolia</i>	107	290	<i>Populus balsamifera</i>	75
236	<i>Pinus albicaulis</i>	107	291	<i>Abies balsamea</i>	75
237	<i>Pinus ponderosa</i>	107	292	<i>Alnus oblongifolia</i>	74
238	<i>Pinus Tæda</i>	107	293	<i>Pinus Strobus</i>	74
239	<i>Castanea vulgaris</i> , var. <i>Americana</i>	106	294	<i>Picea alba</i>	74
240	<i>Pinus glabra</i>	106			

Relative Order.	Species.	Crushing Weight.	Relative Order.	Species.	Crushing Weight.
295	Picea Sitchensis	72	305	Abies subalpina	64
296	Asculus glabra	71	306	Abies amabilis	64
297	Thuja gigantea	70	307	Tilia Americana	63
298	Asimina triloba	69	308	Populus trichocarpa	63
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